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Practical Verification and Optimization Paths of Cluster Cultivation of High-Skilled Talents — A Case Study of the Large Cruise Specialty Cluster

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Abstract: ***As a landmark sector featuring deep integration of high-end equipment manufacturing and modern services, the large cruise industry has long industrial chains and highly compound job positions. Its structural talent supply-demand imbalance is representative of high-end integrated industries, while the traditional single-discipline cultivation model can barely adapt to industrial development needs. Relying on its long-standing academic heritage in shipbuilding and navigation, Jiangsu Maritime Institute adopts the industrial chain-oriented three-layer coupling cluster cultivation model, advances supply-side reform of talent cultivation and forms a relatively sound practical paradigm. This paper presents its practical paths, summarizes effects, analyzes deficiencies and proposes optimization directions. The study proves the model effectively improves talents' post competence and industrial adaptability, providing a replicable paradigm for high-skilled talent cultivation in similar high-end integrated industries.***

Keywords: Large cruise; Specialty cluster; Practical verification; Industry-education integration; Talent cultivation.

1. BASIS FOR CASE SELECTION AND PRACTICAL BACKGROUND

Selecting the large cruise industry as the sample for practical verification of the cluster cultivation model has typical industrial representativeness and theoretical verification value. Known as "the pearl on the crown of shipbuilding", the large cruise is a typical industry with deep integration of high-end equipment manufacturing and modern services. Its industrial chain covers multiple links including R&D and design, production and construction, and operation and service, featuring long chains, complex division systems and highly compound posts. The competence requirements for talents present characteristics of high precision, compoundness and whole-chain coverage.

Meanwhile, China's large cruise industry is at a critical stage of transformation from introduction and digestion to independent development. With the delivery and operation of the first domestically built large cruise ship, the industry has fully entered a new phase of independent design, independent construction and independent operation. There is a huge shortage of high-skilled talents across the whole industrial chain, and the structural contradiction between talent supply and demand is highly prominent. This aligns closely with the talent dilemma commonly faced by China's high-end integrated industries, and can effectively verify the universality and practical effectiveness of the cluster cultivation model.

From the talent supply side, traditional shipbuilding and tourism specialties are established based on single-discipline logic, and generally suffer from insufficient adaptability to the cruise industry. The specialty layout focuses on single industrial links: shipbuilding specialties emphasize the construction link while tourism specialties emphasize the service link, with insufficient coverage of emerging high value-added fields such as cruise interior outfitting, resulting in structural mismatch with whole-chain talent demand. The teaching system overemphasizes theoretical knowledge and single-skill training, which deviates from the high-skill requirements of high-precision, scenario-based posts, leading to a long post-adaptation period for students. School-enterprise cooperation mostly remains at shallow project-based collaboration, lacking long-term collaborative mechanisms and making it difficult to support systematic cluster-based education. These problems restrict the supply quality of high-skilled talents in the cruise industry and become a talent bottleneck for industrial upgrading.

As a representative vocational college for shipbuilding and navigation education in China, Jiangsu Maritime Institute has over 70 years of professional schooling heritage and a solid educational foundation in fields such as marine engineering, navigation technology and cruise services. In recent years, seizing the development

opportunities of the domestic large cruise industry, the university has taken the industrial chain-oriented high-skilled talent cluster cultivation model as the core framework, systematically promoted specialty cluster construction and talent cultivation model reform, restructured specialty layout, rebuilt the teaching system and built collaboration platforms around the whole cruise industrial chain. It has formed relatively systematic practical exploration, providing a vivid case sample for the practical verification of the model.

2. PRACTICAL IMPLEMENTATION OF THE THREE-LAYER COUPLING CLUSTER CULTIVATION MODEL

Jiangsu Maritime Institute strictly follows the three-layer coupling logic of "structural layer, implementation layer and guarantee layer", fully embeds the industrial chain division system into all links of talent cultivation, realizes the systematic transformation of model design from theoretical construction to practical implementation, and forms a distinctive practical paradigm for cruise specialty cluster education.

2.1 Practice at the Structural Layer

In structural layer practice, the university restructures specialty layout with the post division of the industrial chain as the anchor point, and implements the dynamic transmission mechanism of industrial demand.

The university cooperates with leading enterprises and industry associations in the cruise industrial chain to conduct whole-chain research. It comprehensively sorts out post divisions across R&D and design, production and construction, and operation and service links, identifies core post groups, disassembles typical work tasks and competence elements, clarifies talent demand scale, competence level and quality requirements for each link, and systematically draws a post competence map of the cruise industrial chain, providing an accurate practical basis for specialty cluster construction.

On this basis, focusing on the three core industrial links of cruise construction, interior outfitting and operation, the university sets up three core specialties: Marine Engineering Technology, Cruise Interior Outfitting Technology and International Cruise Cabin Service Management, corresponding to key post groups in the industrial chain respectively. It also sets up supporting specialties such as Art Design and Mechatronics, forming a complementary and collaborative specialty matrix.

In response to the professional gap in the field of cruise interior outfitting in China, the university pioneered the specialty direction of cruise interior outfitting technology, accurately filling the talent supply shortfall in high value-added links of the industrial chain, and realizing full coverage of the specialty cluster over core links of the whole cruise industrial chain.

At the same time, the university establishes a dynamic adjustment mechanism driven by industrial demand. It sets up an industrial demand research and judgment team composed of industry experts, enterprise technical backbones and specialty leaders, and establishes an annual industrial research and standard revision system to dynamically adjust specialty directions and cultivation orientation. It also takes the lead in developing national-level professional teaching standards such as Cruise Interior Outfitting Technology as well as supporting curriculum and practical training standards together with industry enterprises, fully integrating enterprise post operation specifications and technical quality standards into the specialty construction system, and ensuring synchronous docking between the specialty chain and the industrial chain at the institutional level.

2.2 Practice at the Implementation Layer

In implementation layer practice, the university takes outcome-based education as the core, systematically reconstructs the teaching implementation system, and implements the school-enterprise standard collaborative research mechanism.

The university implements reverse curriculum design under the OBE concept. Taking the comprehensive competence requirements of core posts in the industrial chain as the final output goal, it reversely sorts out cultivation requirements in terms of knowledge, skills and literacy, breaks the traditional disciplinary curriculum structure, integrates teaching content with typical work tasks as the core, and constructs a modular curriculum system of "public basic module + professional core module + cross-specialty shared module". Among them, the cross-specialty shared module focuses on cross-post collaboration demands in the industrial chain, cultivates

students' whole-chain cognition and compound competence, and adapts to the integrated post characteristics of the cruise industry.

The university introduces real enterprise projects in cruise construction, interior outfitting and operation into the teaching process, implements project-based teaching with real projects as carriers, and forms a school-enterprise dual-teacher teaching team. Teaching is organized around projects, guiding students to participate in the entire workflow of demand analysis, scheme design, on-site implementation and achievement acceptance, realizing the integration of theory and practice through "learning by doing, doing by learning".

Project setting follows the progressive logic from easy to difficult, gradually transitioning from single-skill training projects to comprehensive production projects, matching the law of students' ability growth.

In response to industry pain points of high cost, high risk and scarce real scenarios for cruise practical training, the university integrates school and enterprise resources to build a four-level progressive practical teaching platform: "real ship cognition - virtual simulation - real-scenario workshop - shipyard practice". It carries out professional cognition enlightenment through real ship visits, develops a virtual simulation training system using digital twin technology to enable repeated training of high-risk and high-cost projects, builds on-campus real-scenario workshops replicating enterprise production scenarios for regular skill training, and conducts on-the-job practical training at enterprise production sites. The four scenarios complement each other with virtual and real forms and progress step by step, covering the whole ability growth process from basic skills to comprehensive practice.

In addition, the university deepens competence building through the integration of posts, courses, competitions and certificates. It integrates vocational skill grade certificate standards and vocational skill competition requirements in the cruise field into the curriculum system and assessment. It transforms the high-precision skill requirements of competitions into daily teaching standards, and embeds certificate assessment content into curriculum evaluation, realizing the effect of promoting learning through competitions and practice through certificates, and strengthening students' skill precision and comprehensive professional literacy.

2.3 Practice at the Guarantee Layer

In guarantee layer practice, relying on the modern industrial college, the university constructs a multi-stakeholder collaborative support system, and implements the two-way resource integration and sharing mechanism and the closed-loop quality evaluation and feedback mechanism.

The university co-builds the Modern Cruise Industry College with leading enterprises in the cruise industrial chain. It establishes a governance structure of "council system + dual chairperson system (school and enterprise)", sets up a council composed of representatives from the government, industry associations, leading enterprises and the university, implements the dual chairperson system, clarifies the rights and responsibilities of all parties, and establishes a regular deliberation and decision-making mechanism.

Enterprises deeply participate in core schooling links such as talent cultivation program formulation, curriculum development and quality evaluation, transforming from cooperative participants to co-governors of schooling, which effectively stimulates the endogenous motivation of enterprises to participate in education.

Relying on the industrial college platform, the university builds a full-cycle closed-loop collaborative education chain, integrating industrial demand and enterprise resources into the whole talent cultivation cycle: enrollment, cultivation, practical training, employment and development. At the enrollment stage, enterprises participate in talent selection and clarify post demands and cultivation directions; at the cultivation stage, enterprises provide core resources such as teachers, projects and training venues; at the employment stage, targeted post matching is carried out; after employment, graduates' career development is continuously tracked, forming a complete closed loop of "demand input, whole-process co-education, feedback optimization".

Following the law of professional ability growth, the university implements four-stage progressive cultivation of "cognition - skill - practice - employment". The junior stage focuses on professional cognition and basic skill consolidation; the middle stage emphasizes special skill strengthening and simulation training; the senior stage focuses on enterprise post practice and employment adaptation. A segmented cultivation mode is adopted to reasonably arrange the time ratio of on-campus study and enterprise practice, realizing the step-by-step identity transformation of students from "quasi-professionals" to "high-skilled talents".

At the same time, the university establishes a digitally empowered process evaluation system. Relying on the digital teaching management platform, it builds personal ability growth files for students, dynamically recording core indicators such as skill mastery, project performance and professional literacy development. It implements a school-enterprise dual-subject assessment mechanism with the participation of school teachers, enterprise mentors and industry experts, combining process evaluation and summative evaluation to comprehensively and objectively reflect students' ability growth, providing data support for teaching improvement and student advancement.

3. PRACTICAL EFFECTS AND EXISTING DEFICIENCIES

After years of reform and practice, the industrial chain-oriented high-skilled talent cluster cultivation model has delivered tangible results in the cruise specialty group. Talent supply quality, core schooling capacity and industry leading role have all been systematically improved, fully verifying the scientific validity and practical feasibility of the model.

3.1 Talent Cultivation Quality

In terms of talent cultivation quality, the overall employment rate, major matching rate and post competence of graduates remain at a high level. Employers express outstanding overall satisfaction with graduates, and a large number of graduates have grown into technical backbones and on-site management talents in core enterprises of the cruise industrial chain.

Students have achieved excellent results in vocational skill competitions at all levels, and their skill level is widely recognized by the industry. The industrial adaptability of talent cultivation has been significantly improved, effectively alleviating the shortage of high-skilled talents in the cruise industry.

Graduates cultivated under the cluster model not only possess solid specialized skills, but also have strong cross-post collaboration ability and comprehensive professional literacy. They can quickly adapt to the compound post requirements of the cruise industrial chain, with a greatly shortened post-adaptation period.

3.2 Industry-education Collaboration Ecology

In terms of industry-education collaboration ecology, the governance structure of the Modern Cruise Industry College has effectively stimulated enterprises' enthusiasm for participating in education. School-enterprise cooperation has upgraded from single-point projects to whole-chain systematic collaboration. Multiple national-level practical training bases and teaching resource libraries have been built, and faculty development, scientific research and social service capabilities have improved simultaneously, forming a sound ecology of collaborative education among government, industry, enterprises and colleges.

Cooperation between the university and leading enterprises continues to deepen. A number of industrial colleges, practical training bases and technological innovation platforms have been co-built. Enterprise resources and educational resources are deeply integrated, and the breadth and depth of industry-education integration continue to expand, forming a positive pattern of school-enterprise symbiosis and collaborative development.

3.3 Industry Leading Role

In terms of industry leading role, the university has taken the lead in developing multiple national-level professional teaching standards in the cruise field, and developed a series of teaching resources and virtual simulation training systems. The formed cluster cultivation practice paradigm has been widely promoted in the industry, providing reference for cruise specialty construction in similar colleges and universities nationwide and playing a strong demonstration and leading role.

The university's cruise specialty cluster has become a benchmark for similar specialty construction in China, effectively driving the overall development of cruise vocational education across the country.

3.4 Existing Deficiencies

While achieving practical results, it should be noted that restricted by factors such as the long cycle of vocational education talent cultivation, professional management systems, and the cost-benefit logic of school-enterprise

cooperation, the cluster cultivation model still has certain deficiencies.

First, there is room for improvement in the response timeliness of industrial demand. Vocational education has a long talent cultivation cycle, and specialty adjustment and curriculum update require formal procedures. Facing the rapid iteration of industrial technology, the response speed of demand transmission and cultivation adjustment still needs to be enhanced.

Second, the depth of internal collaboration within the cluster needs to be strengthened. Cross-specialty resource sharing and collaborative education are still constrained by administrative barriers, and the synergy effect between specialties has not been fully exerted.

Third, enterprises' motivation to participate in education can be further stimulated. The school-enterprise benefit sharing mechanism is not yet sound, and the unequal cost-benefit ratio for enterprises participating in education affects the sustainability of their in-depth participation.

4. OPTIMIZATION PATHS AND FUTURE PROSPECTS

In view of the deficiencies in practice, and in light of the development laws of vocational education and industrial development trends, the continuous optimization and improvement of the cluster cultivation model can be promoted from three aspects.

First, improve the dynamic response to industrial demand and the management level of teaching processes through digital empowerment. Build a digital industrial demand monitoring platform, use big data technology to collect industrial dynamics and post demand information in real time, and improve the accuracy and timeliness of demand research and judgment. Promote digital teaching reform, build a modular and rapidly iterable digital curriculum resource system, shorten the curriculum update cycle, and improve the response speed of teaching content to industrial changes. At the same time, use digital technology to optimize teaching management processes, and improve the management efficiency and refinement level of cluster cultivation.

Second, deepen internal governance reform of specialty clusters and break administrative barriers to cross-specialty collaboration. Optimize the management system of specialty clusters, grant clusters greater autonomy in resource allocation, establish a unified resource sharing mechanism within the cluster, promote in-depth sharing of resources such as teachers, courses and training equipment, and give full play to the synergy effect of the cluster. Reform the teacher assessment and evaluation mechanism, encourage teachers to carry out cross-specialty teaching and research cooperation, and provide institutional guarantee for cross-specialty collaborative education.

Third, expand value co-creation scenarios of industry-education integration and improve the school-enterprise benefit sharing mechanism. Deepen school-enterprise cooperation in technological R&D, social services, achievement transformation and other areas, expand value co-creation scenarios of industry-education integration, so that enterprises can obtain multiple benefits such as technical services and talent supply while participating in education, achieving a win-win situation. Establish and improve the school-enterprise benefit distribution mechanism, clarify the rights and interests of all parties in cooperation, stimulate the endogenous motivation of enterprises to participate in education, and ensure the long-term effectiveness of industry-education collaboration.

In the future, with the continuous advancement of industrial chain modernization and the deepening of vocational education reform, the high-skilled talent cluster cultivation model will be continuously improved and play a greater role in serving industrial upgrading. The in-depth application of digital technology will further enhance the operational efficiency and adaptability of the model. The continuous deepening of industry-education integration will provide a more solid foundation for the model, promote the continuous improvement of high-skilled talent cultivation quality, and provide stronger talent support for industrial chain modernization.

5. CONCLUSION

Practical verification taking the large cruise specialty cluster as a sample shows that the industrial chain-oriented three-layer coupling high-skilled talent cluster cultivation model can effectively solve the structural mismatch between the traditional talent cultivation model and industrial demand, significantly improve the industrial adaptability and post competence of talent cultivation, and represents an effective path for vocational education to

serve industrial chain upgrading.

This practical paradigm applies not only to the cruise industry, but also has reference significance for high-skilled talent cultivation in various integrated industries such as high-end equipment manufacturing and modern services. In follow-up practice, it is necessary to continuously optimize the model operation mechanism and deepen industry-education integration, so that the cluster cultivation model can better adapt to industrial development needs and provide solid high-skilled talent support for China's industrial chain modernization.

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REFERENCES

[1] Li M Q, Zang L. Value Orientation, Logical Mechanism and Implementation Path of Cluster Cultivation of High-Skilled Talents[J]. *Education and Vocation*, 2026(10): 15-22.
[2] Zhuang X Z. Internal Contradictions and Solutions of Industry-Education Integration[J]. *China Higher Education Research*, 2018(09): 81-86.
[3] Qian J N, Liu X. Connotation, Operation Mechanism and Promotion Path of City-Level Industry-Education Consortia: From the Perspective of High-Quality Development of Vocational Education[J]. *Education and Vocation*, 2024(15): 22-29.
[4] Dong Y Z. Model Construction, Practical Dilemmas and Practical Strategies of Deep Integration Ecosystem of Industry and Education[J]. *Education and Vocation*, 2024(18): 44-49.
[5] Liu X, Wang Y Q. Connotation, Construction Goals and Promotion Path of Industry-Education Integration Community[J]. *Modern Education Management, 2024*(11): 106-115.