

Training Model of Talent Development under the Integration and Development of Maritime Industry: Experience and Enlightenment from China-ASEAN Free Trade Port

Xinyi Ma¹, Congjin Miao^{1,*}, Li Wang², Qian Liu¹

¹Key Laboratory of Philosophy and Social Science in Hainan Province of Hainan Free Trade Port International Shipping Development and Property Digitization, Hainan Vocational University of Science and Technology, Haikou, 571126, China

²Continuing Education College, Hainan Vocational University of Science and Technology, Haikou, 571126, China

*Corresponding author

Abstract: This paper aims to study the impact of maritime industry development in the China-ASEAN Free Trade Port on talent training models. By analyzing this development trend, it explores the challenges and opportunities faced by talent training in the process of integration and development. Through in-depth research on talent training models in the China-ASEAN Free Trade Port maritime industry, this paper proposes some insights and suggestions aimed at optimizing and innovating talent training models to meet the increasingly complex and diverse needs of the maritime industry.

Keywords: maritime industry; integration and development; talent training model; China-ASEAN Free Trade Port; experience

1. Introduction

As an important cooperation platform between the two major economic entities, the China-ASEAN Free Trade Port provides unprecedented opportunities and challenges for the integrated development of the maritime industry. As a crucial pillar of global trade and economic development, the talent training model required for its integrated development has become a focus of attention. This paper will explore the talent training model of the maritime industry in the China-ASEAN Free Trade Port in this context, as well as the experiences and insights it entails.

2. Background and Current Situation of Integrated Development in the Maritime Industry

2.1 Evolution and Trends of the Maritime Industry

The maritime industry has always been the center of trade, economic development, and cultural exchange since ancient times. From simple vessels in ancient times to highly intelligent modern ships today, maritime technology has been rapidly evolving. Historically, the maritime industry has mainly focused on cargo transportation and navigation safety. However, driven by globalization and technological advancements, the maritime industry has gradually expanded into multiple domains. The rise of digital maritime technology, advocacy for environmentally friendly shipping, and the emergence of unmanned vessels signify the comprehensive transformation of the maritime industry (Lambert et al., 2019). This transformation indicates broader applications and diversified functions, bringing about broader prospects for the maritime industry's development.

However, today, this industry also faces unprecedented challenges and opportunities. The emergence of new technologies such as autonomous navigation technology and ship intelligence brings disruptive changes to the maritime industry. The development of autonomous navigation technology can enhance navigation efficiency and safety (Ringsberg, Cole, 2020), while intelligent ship systems improve operational efficiency. Simultaneously, the global demand for sustainability is growing, making environmentally friendly shipping and renewable energy core aspects of maritime industry

development. These challenges also harbor opportunities, driving the entire industry towards more intelligent, efficient, and environmentally friendly directions.

By exploring green shipping and environmental technologies, the maritime industry can effectively address the challenges of climate change and environmental protection (Germond, Mazaris, 2019). This sustained development trend will guide the maritime industry towards more intelligent, digitalized, and environmentally friendly directions, providing solid support for the prosperity of global trade and the economy.

2.2 Analysis of the Impact of Integrated Development on Talent Training Models

The integrated development of the maritime industry brings new challenges to talent training models. Traditional training models typically focus on skill training in specific fields. However, in the era of integrated development, there is a need to emphasize cross-disciplinary skills and comprehensive abilities. This implies that training models need to pay more attention to cultivating interdisciplinary knowledge, practical applications, and innovation capabilities. The development of the maritime industry is no longer confined to single skills but requires cross-disciplinary knowledge and skills. For example, familiarity with ship operations is not enough; one also needs knowledge in digital maritime technology, environmental awareness, and international trade regulations.

This transformation requires training models to be more closely aligned with practical applications and to keep pace with technological changes. The integration of digital training tools and remote teaching technologies has become an indispensable part of training. The rapid technological development of the maritime industry also requires training models to adjust promptly and use modern teaching tools and methods. For example, the application of technologies such as virtual laboratories and simulated navigation equipment can make training more closely aligned with practical operations and help cultivate students' problem-solving and adaptability skills when facing complex situations.^[1]

Therefore, current training models need continuous adjustment and innovation to meet the diverse skills required for integrated development. This innovation may involve updating curriculum settings, improving teaching methods, and integrating educational resources. Only by synchronizing with technological and industrial developments can training models better provide competitive talent support for the integrated development of the maritime industry.

2.3 Development Background of the China-ASEAN Free Trade Port

As a new type of international cooperation platform, the China-ASEAN Free Trade Port is becoming a key force with profound influence on the development of the maritime industry. The introduction of this policy aims to promote trade liberalization, facilitation, and industrial upgrading, bringing new development opportunities for the maritime industry. The open policies and facilitation measures advocated by the Free Trade Port will greatly promote regional and international trade cooperation and investment activities, creating a broader market space and more convenient trading environment for the maritime industry.^[2]

The promotion of this Free Trade Port policy will greatly accelerate the integration and enhancement of industries such as shipping, port services, and logistics in the region. Its potential impact is not limited to the shipping industry but extends to the development of the entire industry chain. For example, the optimization and improvement of shipping services, cargo handling, and warehouse management will directly affect the operational efficiency and quality of the maritime industry. This integration is also expected to further enhance the level of shipping services, accelerate the circulation of goods, and thereby enhance the competitiveness of the maritime industry in the global market.^[3]

In addition to accelerating industry integration, the Free Trade Port policy will also promote international cooperation in innovation and talent training. As the maritime industry continues to develop, the demand for new technologies and concepts is also growing. The emergence of the China-ASEAN Free Trade Port will provide a more convenient platform for technical exchanges and innovation cooperation between countries, facilitating the sharing of the latest technologies and best practices within the industry. At the same time, this will also provide more international cooperation opportunities for talent training, attracting outstanding talents from different countries and regions, and promoting cross-cultural exchanges and cooperation in talent.

3. Analysis of Talent Training Models in the Maritime Industry

3.1 Analysis of Traditional Talent Training Models: Strengths and Limitations

The traditional talent training model in the maritime industry has its unique advantages in cultivating skills. This model typically focuses on the systematic cultivation and inheritance of fundamental skills, enabling students to solidly grasp the professional techniques required for navigation. Emphasizing practical training and experiential learning, it allows students to quickly master the technical essentials through hands-on practice and guidance. This specialized training model efficiently produces a large number of technically proficient and experienced talents in a short period, supplying the industry with a significant number of skilled professionals and ensuring its stable operation.

However, the traditional model also has some limitations. The teaching content is relatively fixed, making it difficult to keep pace with changes in new technologies and industry trends. The rapidly evolving maritime technology and industry require more updates involving the latest science and international knowledge, areas in which traditional models often lag. Moreover, excessive specialization may limit talent's cross-disciplinary development, resulting in students lacking sufficient knowledge reserves and adaptability in other fields (Bao, Duan, 2021).^[4] This singular specialization model struggles to adapt to emerging cross-disciplinary demands and diverse work environments, resulting in a relatively insufficient comprehensive quality of talents. Additionally, the teaching methods are relatively monotonous, lacking innovation and interactivity, thus failing to stimulate students' creativity and practical abilities, which affects their overall development.

3.2 Impact of Emerging Technologies on Talent Training

The rise of emerging technologies has brought revolutionary changes to talent training in the maritime industry. The development of digital navigation, unmanned vessel technology, artificial intelligence, and other fields has posed new requirements for training talents with innovation and cross-disciplinary skills. This transformation not only demands students to master traditional maritime skills but also requires them to possess the ability to apply digital technology and understand emerging technologies. Therefore, traditional training models need to be deeply integrated with modern technology, such as integrating virtual laboratories, simulation navigation, and other technologies, to enhance students' digitalization and intelligence levels.^[5]

Additionally, new technologies have provided more convenient and flexible teaching methods for education in the maritime industry. New tools such as remote teaching and online learning platforms offer students access to a wider range of learning resources and opportunities for international cooperation. This flexibility allows students to access knowledge anytime, anywhere, and engage in communication and collaboration globally. The shift in teaching methods also helps promote cross-cultural exchanges, cultivate students' international perspectives, and collaborative abilities, providing strong support for their future success in the globalized maritime industry.^[6]

3.3 Analysis of Talent Demand in the China-ASEAN Free Trade Port Maritime Industry

The implementation of the China-ASEAN Free Trade Port policy has brought new challenges and opportunities for talent demand in the maritime industry. This policy will drive the rapid development of the maritime industry and pose higher requirements for talent reserves and quality. From technical reserves to cross-cultural communication and a global perspective, talent demand presents diversified and composite characteristics. To adapt to this change, talent training models need to align more closely with market demands, cultivating composite talents with international perspectives and diverse qualities.^[7] This model requires a focus on cultivating aspects such as cross-cultural communication and international trade regulations to meet the talent demand of the Free Trade Port maritime industry.

With the implementation of the China-ASEAN Free Trade Port, higher-level requirements are placed on talent in the maritime industry. In addition to traditional technical reserves and professional skills, the ability to engage in cross-cultural communication and cooperation has become essential. Cultivating a global perspective and awareness of international cooperation will give talents an advantage in handling international business. Therefore, talent training models need to pay more attention to cross-cultural communication and cooperation abilities in an internationalized context. At the same time, understanding and complying with international trade regulations have become

necessary, enabling talents to adeptly navigate cross-border business and provide strong support for the international development of enterprises and industries.^[8]

4. Innovative Talent Training Models under Integration and Development

4.1 Exploration of Interdisciplinary Training Models

In the context of integrated development, the demand for talents in the maritime industry has gradually surpassed the traditional scope of professional skills, placing higher requirements on comprehensive qualities and broad knowledge reserves. Therefore, the exploration of interdisciplinary training models has become crucial. This model emphasizes not only the mastery of professional skills but also the integration of knowledge from different disciplinary fields into training to cultivate talents with enhanced comprehensive abilities and broad perspectives. For example, integrating knowledge from maritime technology with environmental science, international trade, and other fields can cultivate talents who are familiar not only with maritime technology but also with environmental regulations and international trade, thus meeting the diversified talent demands of the integrated development era more effectively.

Such interdisciplinary training models are not merely extensions of traditional skills but rather integrations of comprehensive knowledge and skills. The integrated development of the maritime industry implies that students need to possess interdisciplinary thinking abilities and be capable of cross-disciplinary integration.^[9] By integrating knowledge from different disciplines, students can gain a more comprehensive understanding of the maritime industry. They will not only comprehend ship operations but also have environmental conservation awareness and cross-border trade skills, thus preparing them to cope with the complex and dynamic global maritime market.^[10]

The value of this interdisciplinary training model lies in cultivating students' abilities for cross-disciplinary collaboration and comprehensive problem analysis. By integrating knowledge and skills from various fields, students developed through this model are better equipped to adapt to the ever-changing trends in the maritime industry. They are capable of examining issues from multiple perspectives, employing diverse thinking to address complex challenges, and fostering healthier and more innovative industry development.

Advancing such interdisciplinary training models requires collaboration between educational institutions and industries, facilitating the integration and crossover of curricula, and providing interdisciplinary teaching resources and practical opportunities. Only in this way can we better meet the diversified talent demands of the maritime industry in the era of integrated development and cultivate versatile talents with comprehensive development and strong adaptability.

4.2 The Role of International Cooperation and Exchange in Talent Training

In the context of globalization, the development of the maritime industry relies on international cooperation and exchange. Such collaboration plays a crucial role in talent training. By partnering with international universities, industry organizations, and companies, advanced teaching concepts and resources from around the world can be introduced, providing students with a more diverse learning experience. This collaboration takes various forms, including joint programs, student exchange projects, international seminars, etc., facilitating cross-cultural exchanges and expanding students' perspectives and ways of thinking. This international cooperation not only enhances the internationalization of training models but also provides students with a broader platform for development.

The importance of international cooperation lies in its ability to bring richer resources and teaching concepts. Through collaboration with international universities, students can access different teaching methods and academic research achievements from various countries and regions, broadening their horizons and expanding their thinking. Additionally, collaboration with international industry organizations and companies enables students to understand the latest trends and requirements of the global maritime industry, and grasp the latest technologies and practical experiences. This international exchange not only contributes to the personal growth of students but also enables the entire training model to better adapt to the development of the maritime industry in the context of globalization.

International cooperation not only enriches knowledge and skills but also promotes students' global competitiveness. Through exchanges with international partners, students can understand work methods and values in different cultural backgrounds, cultivating their abilities in cross-cultural

communication and collaboration. This global perspective and international exchange provide strong support for students' future development in the international maritime industry.

4.3 Technological Innovation and Reform of Educational Methods

With the rapid development of technology, educational methods are constantly being iterated and innovated. In talent training for the maritime industry, incorporating the latest technology is necessary. This requires comprehensive reform of educational methods. By utilizing advanced technological means such as virtual laboratories and simulated navigation equipment, students can engage in practical exercises in virtual environments, enhancing their practical skills. This simulated training allows students to experience various complex situations in a safe and controllable environment, improving their ability to handle challenges and crises.

At the same time, the development of digital teaching content and online learning platforms makes learning more convenient and flexible. Through digital teaching resources, students can access learning materials anytime, anywhere, enhancing their ability for self-directed learning. Online learning platforms also provide opportunities for interactive communication, stimulating students' enthusiasm for learning and enhancing learning effectiveness through exchanges and discussions with classmates and teachers.

This technological innovation and reform of educational methods not only improve the efficiency and quality of teaching but also promote personalized education. Students' individualized needs can be better met, and education is no longer a single-mode indoctrination but rather emphasizes students' autonomy and initiative in learning. This innovation provides a broader and more diversified learning environment for talent cultivation in the maritime industry in the era of integration and development.

5. Experience and Insights on Talent Training in the China-ASEAN Free Trade Port Maritime Industry

5.1 Case Study Analysis

The China-ASEAN Free Trade Port has accumulated numerous remarkable success stories in talent training for the maritime industry. These cases demonstrate outstanding practices in nurturing maritime talents in the region. Firstly, close collaboration between the Free Trade Port and higher education institutions and enterprises has erected a bridge for talent training. Through this collaboration, specialized practical training bases tailored for the maritime industry have been established. These bases utilize advanced virtual simulation technology, combined with practical operations, to provide students with extremely realistic and comprehensive practical environments. Students can simulate maritime operations in the virtual environment, enhance their skills training, and apply the knowledge learned in practice, thus improving their adaptability and practical abilities.

In addition to the establishment of these bases, the China-ASEAN Free Trade Port has also promoted international educational programs and student exchange initiatives, providing a platform for students to exchange with international advanced educational resources. These programs offer students the opportunity to interact with professionals in the international maritime field, expanding their academic horizons and enhancing their understanding of the development trends and requirements of the international maritime industry. Such international exchanges also inspire students' awareness of cross-cultural cooperation and diverse perspectives, laying a solid foundation for them to confidently and diversely showcase their abilities on the global maritime stage in the future.

In summary, the success stories of talent training in the maritime industry within the China-ASEAN Free Trade Port reflect its efforts in constructing practical teaching bases and promoting international exchange and cooperation. These successful practices provide valuable experience for other regions, encouraging them to actively construct innovative teaching models and expand international exchanges to meet the ever-changing demands of the maritime industry.

5.2 Experience Summary and Insights for Other Regions

The experience of talent training in the China-ASEAN Free Trade Port's maritime industry provides valuable insights for talent training in other regions. Firstly, establishing practical training bases has been proven to be an important approach to enhancing students' practical skills. These bases,

combining virtual technology with practical operations, help improve students' skill levels. By simulating real maritime environments, students can engage in practical training in a safe and controlled environment, better preparing them for complex maritime operations. The establishment of such practical bases provides students with a more comprehensive and realistic learning experience.

Secondly, conducting international teaching programs and exchange activities is crucial for students to broaden their international perspectives. These programs provide students with opportunities to understand the latest trends in the international maritime industry and promote exchanges and cooperation with international peers. Through participating in international exchanges, students can learn from the experiences of the maritime industry in different countries and regions, enhancing their understanding of global maritime development. This international perspective cultivates students' global thinking and cross-cultural communication skills, laying a solid foundation for them to better showcase their personal strengths and skills on the international maritime stage.

These experiences provide valuable guidance for talent training in the maritime industry in other regions. Other areas may consider establishing similar practical training bases, introducing advanced virtual technology and practical operation methods to enhance students' practical skills. At the same time, strengthening international teaching programs and exchange cooperation provides students with more opportunities to exchange with international advanced maritime education resources, enhancing their international competitiveness and their ability to adapt to the development of the international maritime industry.

6. Conclusion

The China-ASEAN Free Trade Port has accumulated rich experience in talent training for the maritime industry, providing important insights for the global maritime sector. The establishment of practical training bases through close cooperation, combined with virtual technology and practical operations, has significantly enhanced students' skill levels and practical capabilities. International teaching programs and exchange activities have expanded students' international perspectives and deepened their understanding of the development of the international maritime industry. Other regions can draw lessons from this experience by establishing similar bases, strengthening cooperation in international teaching programs, and cultivating maritime talents with a more global perspective and practical skills, thereby providing guidance and support for the development of the global maritime industry.

Acknowledgements

Funding Project: Project Source: Key Project of Higher Education Teaching Reform in Hainan Province, Project Number: (Hnjg2024ZD-69), Project Title: Research on International Cooperation in Maritime Vocational Education under the Construction of Hainan Free Trade Port in "China-ASEAN" Context.

References

- [1] Xing Hui. *Collaborative Training of Maritime Talents between Schools and Enterprises Oriented to Industry Demand* [J]. *Maritime Education Research*, 2021, 39(03): 6-14.
- [2] Xue Han, Lan Sihai. *Applied University Industry Talent Training for Intelligent Navigation New Majors* [J]. *Pearl River Shipping*, 2021(10): 88-89.
- [3] Qi Jundi, Jia Liankun. *Research on the Path of Integration and Development of Maritime Culture and Blue Sports Industry under the Background of "Belt and Road"* [J]. *Dongyue Tribune*, 2016, 37(08): 188-192.
- [4] Liao Weizhang, Hou Jingfeng, Li Tianhua. *Exploration of Professional Talent Training for Intelligent Construction Technology* [J]. *Building Technology*, 2022, 53(11): 1580-1584.
- [5] Yu Yang, Meng Xiongfei. *Research on Modern Industrial Colleges of Applied Undergraduate Universities in Maritime Majors* [J]. *Journal of Qingdao Ocean Shipping College*, 2023, 44(03).
- [6] Gao Yude, Bao Zijian, Sun Chen. *Globalization of Service Trade and China's Response to Maritime Education* [J]. *Journal of Qingdao Ocean Shipping College*, 2001(01): 8-12.
- [7] Lambert N, Turner J, Hamflett A. *Technology and the blue economy: from autonomous shipping to big data* [M]. Kogan Page Publishers, 2019.

[8] Ringsberg A H, Cole S. *Maritime security guidelines: a study of Swedish ports' perceived barriers to compliance [J]. Maritime Policy & Management, 2020, 47(3): 388-401.*

[9] Germond B, Mazaris A D. *Climate change and maritime security [J]. Marine Policy, 2019, 99: 262-266.*

[10] Bao J, Li Y, Duan Z, et al. *Key factors affecting the quality of maritime education and training: empirical evidence from China[J]. The Journal of Navigation, 2021, 74(2): 396-408.*