

Cultivation and Practice Exploration of Craftsmanship Spirit in Modern Apprenticeship System for Ship Majors

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Abstract

The rapid development of China's shipbuilding industry has led to an increasing demand for highly skilled shipbuilding professionals. However, traditional education methods lack practical skills. Therefore, the research focuses on exploring the cultivation strategies of craftsmanship spirit among students majoring in shipbuilding within the framework of the modern apprenticeship system. Taking the shipbuilding major at Hainan Tropical Ocean University as an example, a series of effective measures have been taken: integrating the spirit of craftsmanship into the curriculum system, increasing the elements of craftsmanship in specialized courses and professional courses; Strengthen practical courses, establish internship bases in cooperation with enterprises, organize project practice and competition activities; Establish a "dual mentor" team, clarify the responsibilities of teachers and mentors, and explore team collaboration models. These measures have achieved certain results and can provide some reference for improving the comprehensive quality and educational quality of shipbuilding professionals.

Keywords

Ship related majors; Modern apprenticeship system; Craftsmanship spirit; Educational Practice.

1. Introduction

1.1. Research Background

Since the concept of craftsmanship spirit was proposed in the State Council's Government Work Report in 2016, it has become a high-frequency term in successive government work reports. General Secretary Xi Jinping has also repeatedly called for the promotion of the craftsmanship spirit and clearly pointed out in his congratulatory letter to the "First Grand Craftsman Innovation Exchange Conference" in 2022: "The technical workers' team is an important force supporting Made in China and Created in China." China is vigorously implementing the "Belt and Road" strategy, and the shipbuilding industry plays an important supporting role. In 2023 alone, China's shipbuilding volume reached 42.32 million deadweight tons, a year-on-year increase of 11.8% [1], and the number of new orders for as many as 14 types of ships ranked first in the world [2], which has led to an increasing demand for highly qualified shipbuilding skilled talents. However, traditional education methods often focus on theoretical knowledge explanations but lack in cultivating students' practical abilities, resulting in graduates facing certain maladjustments and lacking market competitiveness when dealing with actual work [3-5].

Against this background, in-depth exploration of the cultivation and promotion of employees' craftsmanship spirit in modern times and the exploration of the cultivation and practice path of students' craftsmanship spirit in the modern apprenticeship system are of great strategic value for China to accelerate the cultivation of great craftsmen and innovative skilled talents,

promote the progress of the shipping industry, and consolidate the core competitive advantage of the shipbuilding industry.

1.2. Research Purpose

The goal of this study is to explore effective measures for Hainan Tropical Ocean University's shipbuilding majors to cultivate craftsmanship spirit relying on the modern apprenticeship system. After in-depth analysis of the connotations of the modern apprenticeship system and the craftsmanship spirit, considering the actual situation of the shipbuilding majors at the college, practical cultivation approaches and methods are provided to offer references for improving the comprehensive quality and educational quality of shipbuilding professionals. In addition, this study also hopes to serve as a reference for other universities and majors in the field of craftsmanship spirit cultivation.

2. Connotations of the Modern Apprenticeship System and Craftsmanship Spirit

2.1. Connotations and Characteristics of the Modern Apprenticeship System

The modern apprenticeship system contains rich content and is an innovative talent training method that combines classical master-apprentice inheritance with contemporary vocational education[6, 7]. This system emphasizes close cooperation between colleges and enterprises, aiming to cultivate high-quality skilled professional talents that meet market needs. Schools are responsible for basic knowledge and theoretical teaching, while enterprises provide real work scenarios and on-the-job skill training. For example, the dual system in Germany involves dual education by enterprises and schools, the flexible contract education in Australia's new apprenticeship system, and the education in the UK's modern apprenticeship system. Innovations of these educational models have achieved remarkable results.

2.2. Connotations and Values of the Craftsmanship Spirit

The connotation of the craftsmanship spirit is rich, and its core essence lies in the pursuit of excellence, striving for perfection, and never compromising on any minor defects[8, 9]. The craftsmanship spirit has extremely high value. From the perspective of enterprises, it helps to improve product quality and enhance corporate competitiveness. For example, the Swiss watchmaking industry, where craftsmen's dedication and focus have made Swiss watches a symbol of high quality, occupying the high-end market[10]. From a social perspective, the craftsmanship spirit motivates more people to pursue excellence and improves the overall labor quality and ethos of society[11]. From a cultural perspective, it is an excellent cultural heritage that carries outstanding qualities such as dedication, perseverance, and innovation, enriching the connotation of national culture and providing strong spiritual impetus for social development[12].

3. Practice of Modern Apprenticeship System in Shipbuilding Majors

3.1. Specialty Setting and Training Objectives

Hainan Tropical Ocean University's International Navigation College communicated with enterprises to understand their employment needs and clarified the goal of cultivating application-oriented and innovative engineering and technical talents in shipbuilding majors who can adapt to the development of shipping and shipbuilding, enabling students to master relevant knowledge of ships and be competent for related work in the shipping industry after graduation. After clarifying the goals, the college further cooperated with enterprises to build professional basic courses, professional core courses, and on-campus practical training courses suitable for students' development. Figure 1 shows the roadmap of specialty setting and

training objectives. Hainan Tropical Ocean University currently has two shipbuilding majors: Ship Electronic Electrical Engineering and Marine Engineering. The major of Nautical Technology has also been approved by the Ministry of Education. Under the guidance of teachers and masters, the modern apprenticeship education is practiced, jointly cultivating students' knowledge and skills.

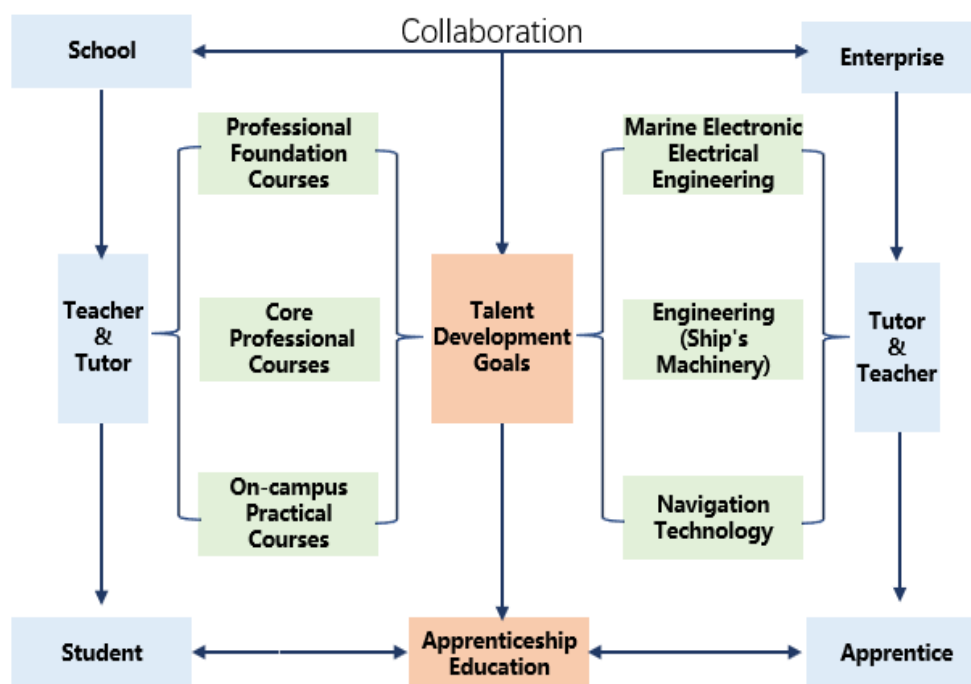


Figure 1. The route of major setting and training goals

3.2. Faculty Team and Practical Achievements

In terms of faculty development, the college focuses on recruiting highly educated doctoral students and senior crew members with work experience. The two complement each other's advantages, helping students improve their knowledge and practical skills. The school actively encourages teachers with certificates of competency and those without certificates to obtain certificates and go to sea to enhance their qualifications, and ensures the welfare benefits of teachers during their time at sea. At the same time, teachers are encouraged to apply for dual-qualified teachers, and more than 10 have been applied for so far. Under the guidance of excellent dual-mentor faculty, students' professional knowledge and practical skills have significantly improved. In recent years, they have won numerous awards in national competitions such as the National Marine Navigation Apparatus Design and Production Competition, the National College Student Ship Energy and Power Innovation Competition, and the Maker Competition. For example, in the National Marine Navigation Apparatus Design and Production Competition, the marine navigation apparatus designed and produced by the students, which has independent intellectual property rights, was highly affirmed by industry experts. Students closely integrate classroom learning with practical operations, enhancing their hands-on practical abilities. At the same time, students' award-winning situations can be used as the basis for additional credit recognition, further increasing their enthusiasm. Figure 2 shows the roadmap of the faculty team and practical achievements.

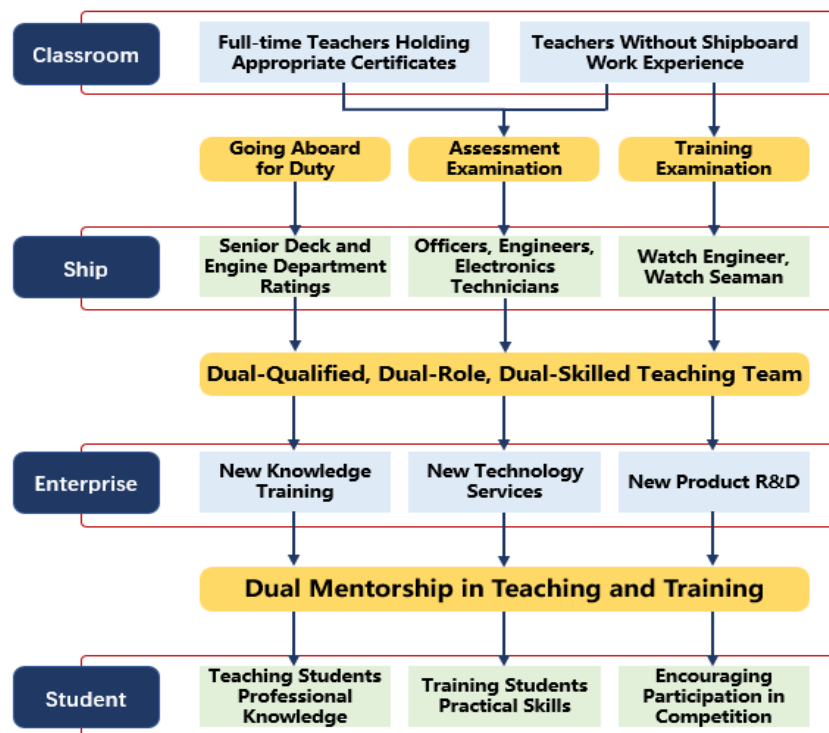


Figure 2. The route of the faculty and practical results

4. Cultivation Path of Craftsmanship Spirit under the Modern Apprenticeship System

4.1. Integrating Craftsmanship Spirit into the Curriculum System

Hainan Tropical Ocean University's International Navigation College cooperated with enterprises to optimize and adjust the curriculum setting of shipbuilding majors, aiming to cultivate students' craftsmanship spirit through a jointly built curriculum system. Figure 3 shows the roadmap of integrating craftsmanship spirit into the curriculum system. On the one hand, the college has added specialized courses and lectures on craftsmanship spirit education, such as "Shipping Theme Lectures," "Shipbuilding Craftsman Culture," and "Craftsmanship Spirit and Professional Quality." Through diverse teaching methods, students can deeply understand the essence and value of the craftsmanship spirit. At the same time, elements of craftsmanship spirit are integrated into professional courses. For example, in the "Circuit Principles" course of the Ship Electronic Electrical Engineering major, stories of innovators breaking through technical difficulties are introduced to stimulate students' innovative consciousness and pursuit of excellence. On the other hand, the college has strengthened practical courses and cooperated with enterprises to build crew internship bases, allowing students to exercise in work environments and personally experience the processes of ship manufacturing and maintenance, feeling the rigorous attitude and craftsmanship spirit of shipbuilders. For example, during internships at 4802 Shipyard, Berthol & Bergmann Shipping Services (Hainan) Co., Ltd., and Hainan Strait Shipping Co., Ltd., students operate under the guidance of enterprise masters, not only improving their professional skills but also cultivating meticulous craftsmanship spirit. These measures jointly promote the improvement of students' craftsmanship spirit, which is conducive to students finding their desired enterprises after graduation.

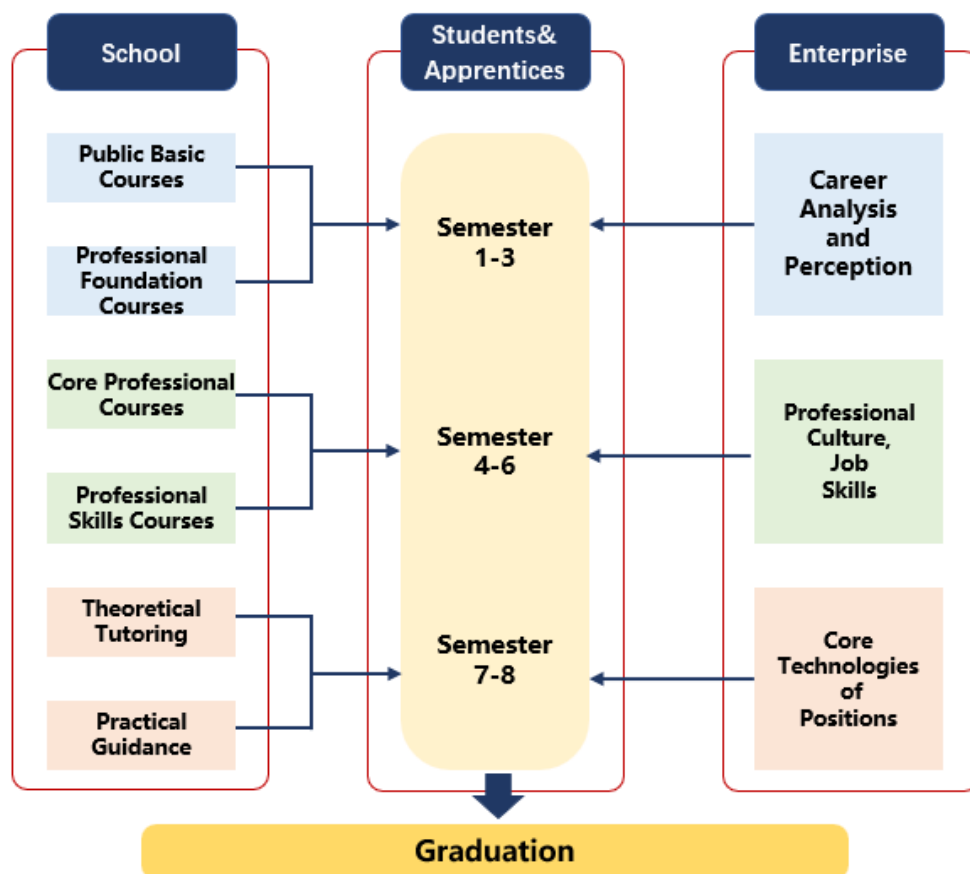


Figure 3. The curriculum system is integrated into the route of the craftsman spirit

4.2. Establishing a "Dual Mentor" Team to Cultivate Craftsmanship Spirit

The characteristic of the modern apprenticeship system lies in its dual-subject education model, where higher education institutions and enterprises jointly assume educational responsibilities. Schools are responsible for basic knowledge and theoretical teaching, while enterprises provide real work scenarios and on-the-job skill training [13, 14]. At the same time, dual mentor guidance is implemented, with school teachers and enterprise masters providing guidance to students from both theoretical and practical aspects. The former builds knowledge systems, while the latter imparts practical experience, industry norms, and professional spirit. Students can promote the close integration of theory and practice, enhancing their vocational abilities and market adaptability [15, 16].

In terms of responsibility division, school teachers focus on the imparting of theoretical knowledge, the guidance of professional quality, and students' career planning, cultivating the craftsmanship spirit through case analysis, etc.; enterprise masters are mainly responsible for the cultivation of practical skills and the inheritance of the craftsmanship spirit, cultivating students' practical abilities and professional spirit through demonstrations, strict requirements, and sharing personal experiences, etc. Figure 4 shows international navigation college students learning ship professional skills. To better leverage the advantages of dual mentors, schools and enterprises need to explore efficient cooperation models, such as jointly planning teaching content, regularly holding teaching seminars and experience sharing meetings, and establishing a dual mentor assessment and evaluation mechanism to ensure the close integration of theoretical education and practical operations, motivating both parties to continuously improve their teaching levels and quality, and jointly cultivating outstanding talents for the industry. For example, during ship maintenance internships, enterprise masters can guide

students in the maintenance of ship power devices, requiring students to operate according to maintenance process standards, cultivating students' craftsmanship spirit of striving for perfection. Enterprise masters can also inspire students' thirst for knowledge and cultivate their innovative thinking by sharing their work experiences and growth processes.



Figure 4. Students of the International School of Navigation learn the professional skills of shipbuilding

5. Conclusion

This study takes Hainan Tropical Ocean University's shipbuilding majors as an example to explore the methods of cultivating craftsmanship spirit within the framework of the modern apprenticeship system. Through the discussion of the connotations of the modern apprenticeship system and the craftsmanship spirit, combined with the specific practices of the shipbuilding majors at the college, the following conclusions are drawn:

Firstly, Hainan Tropical Ocean University's shipbuilding majors have a clear training direction, committed to cultivating application-oriented talents in the shipbuilding direction. The college actively recruits and cultivates excellent faculty teams, increasing the proportion of dual-qualified teachers, which is conducive to students mastering certain theoretical knowledge and practical skills and effectively combining the two, such as encouraging students to intern at ship enterprises and participate in various competitions at all levels, prompting students to develop a craftsmanship spirit of striving for perfection and teamwork abilities.

Secondly, in terms of the cultivation of craftsmanship spirit, through strategies such as integrating craftsmanship spirit into the curriculum system and establishing a "dual mentor" team to cultivate craftsmanship spirit, good results have been achieved. In terms of curriculum setting adjustments, specialized courses and lectures on craftsmanship spirit education have been added. In terms of strengthening practical courses, internship bases have been established in cooperation with enterprises, and students have followed enterprise masters to learn the craftsmanship spirit. The responsibilities of teachers and masters have been clarified, and team collaboration models have been explored, jointly promoting the cultivation of students' craftsmanship spirit in the modern apprenticeship system.

Finally, the modern apprenticeship system should continuously explore and innovate in the cultivation of shipbuilding majors' craftsmanship spirit, deepen the integration of the modern

apprenticeship system and the cultivation of craftsmanship spirit, and make greater contributions to the cultivation of high-quality shipbuilding professionals.

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