

The educational mode targeting at cultivating students' fundamental capabilities of marine science and technology

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Abstract: In order to cultivate students with the fundamental capability of marine science and technology, this paper explores the relevant education modes. Combined with the research methods of literature review and system analysis, this paper summarizes the significance of cultivating students' fundamental capability in the field of marine science and technology. The specific modes include strengthening the construction of marine science teaching development system, strengthening the design of course content, and strengthening the ideological and political construction of classes. The conclusion of this paper could provide some important implications for relevant educators and managers to cultivate students with fundamental capability of marine science and technology efficiently.

1. Introduction

The marine economy, as the fundamental content and core link of establishing a maritime power, largely relies on the comprehensive capabilities of marine technology. As an important manifestation of a country's comprehensive strength, the fundamental capabilities of marine technology are of great significance for maintaining marine rights and security, developing and utilizing marine resources, expanding marine utilization space, and governance and construction of marine ecology that are all as the national strategic mission^[1]. For the college student, there is an urgent need to enhance their recognition and understanding of the field of marine science and technology, and master their key technological breakthroughs in the layout and construction of a modern marine economic system. To this end, accurately identifying teaching methods to cultivate students' fundamental marine science and technology capabilities and thus constructing innovative teaching modes will be a long-term strategic significance for exploring crucial factors and paths to enhance students' marine knowledge and capturing the key points of blue economic growth.

2. Analysis of basic abilities in marine science and technology

2.1 The connotation of basic capabilities in marine science and technology

Currently, the academic community has not separately defined the concept of basic capabilities in marine science and technology. However, in terms of basic technological capabilities, some scholars have provided insights. From a narrow perspective, they believe that basic technological capabilities are the material factors that affect the development of technology itself. These materials mainly play a role in supporting and serving technological research and development activities, including personnel engaged in technological activities, research laboratories, scientific instruments and equipment, technological information and data, as well as components of the technological innovation service system. From a broad perspective, it is proposed that the basic capability of science and technology is an important component of the construction of the scientific and technological innovation system. It is the most important material foundation guarantee for ensuring and promoting scientific and technological innovation activities, improving the independent innovation capability of science and technology, training and gathering high-level talents, and building a scientific and technological innovation-oriented country^[2]. In view of this, this study believes that the basic capacity of Marine science and technology mainly refers to the overall allocation and application capacity of Marine science and technology development infrastructure construction and human, material, financial, information and other resources of Marine science and technology, which are the basic conditions and material guarantee for Marine science and technology innovation activities.

Since the 18th National Congress of the Communist Party of China, with the overall strategic outline of building a strong maritime country, it has guided the joint construction of the marine industry, marine technology industry, and marine technology platforms, preliminarily improved the dispersed, repetitive, and inefficient allocation of resources, gradually formed the support capacity for marine technology research and development activities, improved the integration, sharing, and investment efficiency of marine technology resources, and promoted the transformation and application of a number of marine technology achievements, and realized the initial pattern of basic capacity building and open service capacity sharing in Marine science and technology.

2.2 Urgent Issues to be Solved in the Basic Ability of Marine Science and Technology

From the perspective of domestic and international situations, China is in the critical period of enhancing the basic capabilities in marine science and technology^[3]. At present, the development level of China's Marine strategic platform, Marine science and technology infrastructure, Marine science and technology environment and other aspects has been significantly improved; Although the number of Marine science and technology innovation talents shows an increasing trend, the average scale of marine scientific research institutions is still characterized by a small total amount and small scale, and the existing scientific research talents cannot meet the needs of China's marine science and technology innovation and development. Therefore, the lack of talent construction greatly restricts the further enhancement of China's independent innovation ability of Marine science and technology.

Focusing on talent cultivation is the first priority capital element for the cultivation of basic abilities in marine science and technology and the construction of the marine science and technology innovation system^[4]. It is necessary to rapidly strengthen the talent cultivation construction of universities in the marine field, increase the number of marine related majors in universities, and provide policy support to universities that carry out ocean-related majors, so as to rapidly increase the scale of higher education ocean-related talents; On this basis, we should improve the marine talent training system in universities, set up diversified courses, give full play to the advantages of internal training and external introduction, and form innovative research teams; And through exploring the

"education-technology-industry" integration and innovation model, continue to export talents for the marine industry. In addition, the state also needs to encourage all kinds of ocean-related research institutions to carry out interdisciplinary, cross-filed and cross-border integration from the perspective of top-level design, accelerate the efficient flow of capital and technical elements in talent construction, build a high-end smart Marine team, and cultivate a marine composite talent team.

3. The significance of cultivating students' fundamental capability of marine science and technology

It is necessary to achieve at the practical significance of marine science and technology for college students. For the higher education in China, such significance is mainly as follows. First, strengthening the construction of fundamental capabilities in marine science and technology is an urgent need to achieve at a high-level technological self-reliance and self-improvement, and it is also a key development direction that college students urgently should concentrate on. At present, there are still some problems in China's marine scientific and technological innovation, e.g. a weaker original innovation capability and the key core technologies being constrained by other countries. To improve China's pressure resistance, adaptability, hedging ability, and countermeasures in scientific and technological innovation, it is necessary to accelerate the construction of a high-level, efficient, safe and controllable scientific and technological fundamental capability system^[5]. This requires a planned and organized layout from the perspective of college students, promoting more and more students to involve in the marine power strategy.

Second, strengthening the construction of fundamental capabilities in marine science and technology is a strategic measure to capture the strategic opportunities of the new round of technological revolution and the transformation of blue economy industry. On the one hand, the interdisciplinary penetration, technological convergence and integration, and the increasing complexity of technological innovation trigger the major scientific discoveries and technological breakthroughs increasingly inseparable from the support of major technological infrastructure and advanced scientific research instruments and equipment^[6]. On the other hand, the scientific research paradigm is facing changes, with a deep integration of industry, academia, research, and application. The cycle from innovation to transformation is significantly shortened, and the connection between technological innovation and production/life is becoming increasingly close. The organizational methods, policy arrangements, institutional culture, and other aspects of innovation activities are being deeply restructured. Such new changes require teachers to accurately grasp the trends and development laws of marine science and technology transformation, and thus redefine the relevant teaching layout.

4. The educational mode explorations for cultivating students' fundamental capabilities of marine science and technology

4.1 Strengthening the construction of development system for marine science teaching

To achieve this goal, relevant universities and colleges should vigorously promote the following aspects of work: First, it should strengthen the construction of R&D platforms such as key laboratories and engineering centers in the marine field, and rely on these R&D platforms to support innovation and diversification of educational modes. At the same time, the universities and colleges need to strengthen cooperation and interaction with firms and relevant R&D institutions, and continuously enhance their innovation capabilities in the field of marine science and technology^[7]. Second, it should promote the construction of marine disciplines closely related to the marine technology industries. The construction of such disciplines in universities and colleges should break

through traditional educational modes, create a market-oriented system for disciplines construction, and form a dynamic adjustment mechanism that is in line with the changes in talents demand. In addition, it is necessary to explore a professional early warning system, form regular analysis reports, timely grasp the “market situation” of disciplinary adjustments, and form a situation where market demand leads disciplinary layout.

4.2 Strengthening course’ content design

On the basis of teaching the overall knowledge system of marine science and technology, teachers need to focus on a profound analysis of the process of marine economics and management and then establish a systematic case library, guiding students to explore new features of marine science and technology from a diverse and open perspective, and highlighting the industry characteristics and advantages from the level of economics and management knowledge^[8].

In the specific teaching process, the following aspects need to be emphasized by teachers. First, the curriculum team teachers should be the main body, and they should construct a course case library design guided by the red spirit spectrum and targeting marine science and technology as the target object. Second, the student teams should be also as the main body, and they should carry out marine science and technology practice roadshows that integrate into the red spirit spectrum. Third, the entrepreneurs and students should be jointly as the main body, teachers should invite some entrepreneurs to enter the classroom and demonstrate how marine firms can apply the red spirit to the entire process of production, operations, and management in reality through practical sharing and interactive communication. Further, students should scientific research on integrating the red spirit into the operations and management of marine firms, and then write research reports^[9].

4.3 Strengthening course’ ideological and political construction

The teaching of professional knowledge should be closely combined with the pattern of ideological and political education, emphasizing that curriculum construction should serve students to establish correct values, establish a solid knowledge system, plan competitive career guidance, and fully rely on the Party’s building and action plan to promote scientific talent cultivation^[10]. In this process, a full use will be made of scene simulation roadshows, entrepreneurs entering the classroom, and other methods to truly demonstrate how the red spirit should guide the entire process of marine science and technology, helping students form a direct understanding of the high-quality development of the marine industry from the perspective of national spiritual value guidance.

5. Conclusions

In general, the fundamental capability of marine science and technology is an important component of the construction of the marine industry system. It is the technical foundation guarantee for safeguarding and promoting China’s marine science and technology innovation activities, improving the independent innovation capability of marine science and technology, cultivating and condensing high-level talents, and establishing an innovative marine economy. This paper explores how universities and colleges can promote the education model of marine science and technology, hoping to provide a reference for talent cultivation in promoting China’s marine power strategy.

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