Research on the Optimization of Marine Engineering English Teaching and Its Alignment with International Standards under the Perspective of the New Maritime Conventions

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Abstract: With the increasing internationalization of the maritime industry, the new maritime conventions have imposed higher requirements on marine engineering English teaching. This study aims to explore how to effectively align and optimize marine engineering English teaching with international standards. Through literature review, it examines the regulations of the new maritime conventions over the past decade and the current status of marine engineering English teaching. Using comparative analysis, it analyzes the discrepancies between current teaching models, curriculum design, teaching content, and international standards. The study delves into specific indicators of English proficiency for engine room personnel as outlined in conventions such as the STCW, providing detailed comparisons with existing marine engineering English syllabi and textbook content. The results indicate gaps in depth of specialized vocabulary, cross-cultural communication skills, and simulation of practical application scenarios between current teaching practices and international standards. Based on these findings, the study proposes suggestions such as optimizing the course system to include more international maritime case studies; improving teaching methods by adopting situational teaching and project-based learning to enhance students' practical abilities; and updating textbook content to ensure alignment with the latest international convention requirements. These recommendations aim to closely integrate marine engineering English teaching with international standards and enhance the international competitiveness of maritime talents.

Keywords: New Maritime Conventions; Marine Engineering English Teaching; International Standards; Alignment Optimization; Maritime Talents.

1. Introduction

1.1 Research Background and Significance

The booming growth of global maritime trade has driven the maritime industry towards greater standardization and internationalization. In recent years, a series of new maritime conventions have been introduced and revised, aimed at improving maritime transport safety and ensuring sustainable development of the marine environment, while imposing strict standards on the professional and language competencies of maritime personnel. Among these, marine engineering English plays a crucial role as an essential tool for crew members in the marine engineering field for international communication, equipment operation, and emergency response. The quality of its teaching directly influences the competitiveness of maritime talents in the international maritime field.

According to the International Maritime Organization (IMO), over 80% of maritime accidents are related to communication difficulties among crew members, and insufficient marine engineering English proficiency is one of the key factors contributing to these communication barriers. Against the backdrop of the comprehensive implementation of new maritime conventions, traditional marine engineering English teaching has gradually revealed discrepancies with international standards in terms of curriculum design, teaching content, and pedagogical methods. For example, the Manila Amendments to the STCW Convention significantly expand the assessment dimensions for crew members' English communication skills to cover various scenarios such as equipment operation instruction comprehension and emergency procedure reporting, posing a tremendous challenge to

existing marine engineering English teaching practices.

Optimizing the alignment between marine engineering English teaching and international standards not only helps enhance the competitiveness of Chinese maritime talents in the international labor market to meet the urgent demand for high-quality maritime professionals under the "Belt and Road" initiative, but also effectively reduces the risk of maritime accidents caused by language communication issues, ensuring the safety of maritime transport and the marine ecological environment. Therefore, conducting this research holds significant practical importance and application value.

1.2 Review of Domestic and International Research Status

Domestically, research on marine engineering English teaching has primarily focused on reforming teaching models and integrating curriculum resources. Qie Yanwei proposed integrating marine engineering English curriculum resources based on project-based teaching methods to enhance students' language application abilities by simulating real project tasks; Zhou Xin discussed the teaching design of project-based teaching in marine engineering English courses, emphasizing the reconstruction of teaching content guided by vocational demands. However, existing studies have largely focused on the teaching methods themselves, with a relative lack of systematic research on aligning maritime new conventions with teaching practices.

International scholars tend to place greater emphasis on the integration of language teaching with industry standards. The application of ESP (English for Specific Purposes) theory in maritime English teaching is relatively widespread, and research shows that incorporating industry regulations and operational processes into English teaching can significantly enhance learners' professional language skills. However, due to differences in the developmental stages of the maritime industry and education systems between domestic and international contexts, foreign research results may not be directly applicable to marine engineering English teaching practices in China.

Overall, there remains a gap in research focusing on the optimization of marine engineering English teaching and its alignment with international standards in the context of new maritime conventions. There is a lack of studies that systematically analyze the current state of teaching from the perspective of international convention requirements and propose targeted optimization strategies, which provides space for the development of this research.

2. Related Concepts and Theoretical Foundations

2.1 Core Content and Requirements of New Maritime Conventions

New maritime conventions center around a series of international regulations established by the International Maritime Organization (IMO), among which the STCW Convention, MARPOL Convention, and SOLAS Convention have far-reaching impacts in the field of marine engineering. The STCW Convention, as an international convention regulating crew training, certification, and watchkeeping standards, explicitly outlines requirements for the English proficiency of marine engineering personnel, covering multiple dimensions such as listening comprehension, spoken expression, and written communication, with a strong emphasis on language application abilities in contexts like equipment operation and emergency handling.

The MARPOL Convention focuses on marine environmental protection, requiring marine operators to accurately understand and execute equipment operation instructions for pollution prevention, and to report and document pollution incidents using professional English. Conversely, the SOLAS Convention emphasizes ship safety, stipulating that crew members must communicate safety procedures and collaborate in firefighting and lifesaving drills in English. These conventions constitute a comprehensive and multi-layered system of international standards, providing direction for marine engineering English teaching.

2.2 Theoretical Basis for the Integration of Marine Engineering English Teaching with International Standards

The ESP (English for Specific Purposes) theory provides significant theoretical support for the integration of marine engineering English teaching with international standards. This theory emphasizes that language teaching should closely revolve around the needs of specific industries, organically combining professional

knowledge with language skills. In marine engineering English teaching, by analyzing the language competency requirements outlined in new maritime conventions, teaching objectives and content can be determined, effectively aligning students' acquired knowledge with international standards.

The CBI (Content-Based Instruction) theory advocates for organizing language teaching around subject content. By integrating operational standards and emergency procedures from new maritime conventions into marine engineering English teaching, students can enhance their language proficiency while learning professional knowledge, achieving dual goals of language learning and professional development. Additionally, constructivist learning theory emphasizes active exploration and meaning-making by learners in authentic contexts, providing theoretical guidance for optimizing marine engineering English teaching through methods such as situational teaching and project-based learning.

3. New Requirements of Maritime New Conventions for Marine Engineering English Teaching

3.1 Internationalized Standards for English Proficiency Indicators

The new maritime conventions present refined and contextualized standards for the English proficiency of marine crew members. In terms of listening comprehension, crew members are required to accurately identify English descriptions of abnormal sounds in ship equipment operation and understand professional terms and directives in international maritime communication. Data from the International Maritime English Test (MET) indicates that in the past three years, the proportion of listening questions related to equipment fault diagnosis has increased from 35% to 45%, highlighting the emphasis on specialized listening proficiency.

In terms of spoken expression, the conventions stipulate that crew members must communicate accurately and fluently in English across scenarios such as equipment operation, navigation safety communication, and emergency incident handling. Written communication requires crew members to produce formal documentation such as equipment maintenance reports and pollution incident records in accordance with international maritime document formats and terminology standards. These standards establish clear objectives for the development of language proficiency in marine engineering English teaching.

3.2 Enhanced Demand for Practical Application Abilities

The new maritime conventions raise higher demands for the practical application abilities of marine engineering English. In the daily operations of a ship, crew members must use English to receive and provide feedback on equipment operation and maintenance instructions, accurately understand English descriptions in technical manuals. In emergency situations, crew members are required to swiftly report incidents, communicate rescue needs, and participate in international collaboration in English.

Data from international maritime investigative agencies reveal that in the management of oil spill incidents, cases where delayed emergency responses were caused by communication barriers accounted for 23% of total incidents. This underscores that strengthening the practical application abilities in marine engineering English is not only essential to meeting international standards but is also crucial for ensuring the safety of maritime transport and improving the efficiency of emergency response.

4. Analysis of the Current Situation of Marine Engineering English Teaching and Its Alignment with International Standards

4.1 Current Status of Curriculum System and Teaching Syllabus

Currently, maritime colleges in China offering marine engineering English courses tend to follow a traditional subject-based structure, where English language knowledge modules are relatively separated from marine engineering professional knowledge modules. Fundamental language courses such as vocabulary and grammar instruction account for over 60% of total class hours, while English practical courses related to professional scenarios such as equipment operation and emergency procedures only make up about 30%. Taking a key maritime college as an example, its marine engineering English course focuses on general English grammar training in the first two semesters,

introducing only a small amount of specialized text reading in the third semester. This setup leads to a significant delay in students' language application abilities compared to the demands of real work scenarios.

In terms of teaching syllabus, most colleges still prioritize vocabulary mastery and grammar proficiency as core assessment metrics. Surveys indicate that 85% of institutions set teaching objectives such as "mastering over 2000 specialized marine engineering vocabulary" and "correctly using more than 15 professional English sentence patterns," while lacking clear quantitative standards for contents required by international maritime conventions, such as "writing English reports for equipment failures" and "cross-cultural communication skills." This syllabus design, which emphasizes knowledge memorization over skill cultivation, results in a lack of alignment between teaching content and international standards.

4.2 Current Status of Teaching Methods and Textbook Content

In terms of teaching methods, traditional lecture-style instruction still predominates. In classroom teaching, educators focus primarily on textbook text analysis, conducting instruction through vocabulary explanations and sentence translations, with interactive elements accounting for less than 20% of class time. Teaching evaluation data from a provincial maritime vocational college reveals that 78% of classroom instruction is still characterized by unidirectional teacher input, lacking interactive practices that simulate ship working scenarios. While some institutions attempt to incorporate multimedia teaching, these efforts are often limited to playing English video materials, failing to create an immersive language application environment.

Regarding textbook content, current marine engineering English textbooks suffer from long update cycles and outdated material. Market research shows that among textbooks published in the past three years, only 35% fully cover the newly added language proficiency requirements of the Manila amendments to the STCW Convention, with missing content in areas such as operating standards for ship ballast water management systems and standards for filling out electronic navigation logs. Some textbook cases still use ship equipment models from a decade ago, failing to align with the current trends of intelligent and automated maritime equipment, making it difficult to meet students' learning needs regarding the latest international standards.

5. Problems in the Alignment of Marine Engineering English Teaching and International Standards

5.1 Disconnection Between Curriculum Systems and International Standards

The current curriculum system does not adequately reflect the hierarchical requirements for language proficiency as outlined in the new maritime conventions. The International Maritime English Competency Certification System (MET) categorizes crew members' language capabilities into operational, management, and advanced management levels, while domestic curriculum systems often adopt a "basic + professional" binary structure, lacking precise targeting of language demands for different positions. For instance, only 12% of institutions offer specialized courses focusing on capacities such as interpreting international maritime regulations and cross-cultural negotiation that are required at the advanced management level.

The incomplete course connection mechanism leads to fragmented knowledge. The marine engineering English curriculum lacks collaborative design with specialized courses like ship power systems and marine automation, making it difficult for students to integrate professional knowledge with English language skills organically. Survey data shows that 62% of students report being unable to accurately describe the working principles of equipment learned in class in English during actual work, reflecting that the curriculum system fails to form a complete chain of "knowledge transmission - skill training - practical application."

5.2 Gap Between Teaching Content and Practical Application

The timeliness of teaching content is insufficient, unable to keep pace with the rapid development of international maritime technology. With the accelerated digital transformation of ships, new technologies like intelligent ship monitoring systems and remote diagnostic platforms are widely used, but the English content covering these areas in textbooks constitutes only 5%. A

feedback report from a shipping company noted that new crew members had a 40% higher rate of misoperation compared to experienced crew when using the latest ship ballast water management system due to their inability to understand the prompts on the English operating interface.

The cultivation of cross-cultural communication skills is weak, making it difficult to adapt to the international maritime work environment. Maritime operations are characterized by a high degree of internationalization, requiring crew members to collaborate with individuals from diverse cultural backgrounds. However, current teaching content includes only 10% of cross-cultural communication knowledge, lacking systematic explanations of international maritime etiquette and business communication norms. Data from international maritime arbitration case databases indicate that improper language expression accounts for 35% of contract dispute cases caused by cultural misunderstandings, highlighting a significant gap between teaching content and practical application.

6. Optimization Strategies for the Alignment of Marine Engineering English Teaching and International Standards

6.1 Optimized Design of Curriculum System and Syllabus

Construct an "ability-oriented" curriculum system that reconstructs course modules based on the requirements of international maritime conventions. Divide marine engineering English courses into three levels: foundational skills, professional applications, and international standards, where foundational skills focus on vocabulary and grammar training, professional applications cover teaching for scenarios such as equipment operation and emergency handling, and the international standards module concentrates on interpreting convention clauses and implementing international standards. Adjust the course proportions to ensure that practical courses account for 50% of total class hours, and add "Connecting Courses for International Maritime English Competency Certification" to achieve seamless alignment with certification systems.

Establish a dynamic and updated teaching syllabus that creates a content adjustment mechanism synchronized with international standards. Every two years, based on the latest amendments to the STCW Convention, MARPOL Convention, etc., update over 30% of the teaching content, integrating cutting-edge knowledge such as operational standards for ship desulfurization devices and English operation guidelines for electronic fuel recording systems into teaching objectives. Implement a "dual evaluation" system that includes not only traditional written exams but also practical assessments in simulated ship working environments, integrating the pass rate of the International Maritime English Test (MET) as part of the teaching quality evaluation metrics.

6.2 Innovative Pathways for Teaching Methods and Textbook Content

Promote a blended teaching model that constructs virtual simulation practice environments. Utilize VR/AR technology to simulate ship engine rooms, emergency command centers, and other scenarios, allowing students to conduct English practice in equipment operation and emergency communication within an immersive environment. Combine online learning platforms to deliver resources such as international maritime news and equipment technical manuals, achieving deep integration of "online independent learning + offline situational training." Pilot data from a certain institution indicates that after adopting this model, student accuracy in tasks related to describing equipment malfunctions in English improved by 28%.

Develop a dynamically updated textbook system that combines "printed textbooks + digital resources" on dual platforms. Collaborate with shipping companies and experts from international maritime organizations to compile multi-dimensional textbooks that incorporate updated convention clauses and intelligent ship technologies. Build a digital resource library that includes 3D demonstration videos of equipment operation, transcriptions of international maritime conference presentations, etc., and update the resources quarterly. Introduce a "modular" textbook design to facilitate the timely supplementation of revisions to international maritime regulations, ensuring that textbook content remains in sync with industry developments.

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