

Research on the Reform of Situational Teaching Method of Maritime English in Higher Vocational Colleges Empowered by Digitalization

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Abstract: Against the dual background of the national digital transformation of vocational education and the intelligent and international development of the shipping industry, as a core course for cultivating maritime professionals, the reform of situational teaching of Maritime English in higher vocational colleges is a key measure to adapt to industrial post demands and improve the quality of talent training. At present, there are still many pain points in the situational teaching of this course. The integration of digital technology and situational teaching method is insufficient, which makes it difficult to meet the high standards of English application ability required by maritime posts. Using various research methods, this paper sorts out the current teaching situation and core problems, explores the reform path of situational teaching method empowered by digitalization, and verifies its effectiveness. Research shows that digital technology can effectively break through teaching limitations and improve students' abilities. The reform path is practical and worthy of popularization, and can provide a reference for the teaching reform of similar majors.

Keywords: Digital Empowerment, Higher Vocational Maritime English, Situational Teaching Method, Teaching Reform, Post Adaptation.

1. Research Background

With the in-depth advancement of the national education digitalization strategy, nine departments including the Ministry of Education have explicitly proposed promoting the digital innovation of teaching methods in vocational education, solving practical problems in professional teaching through digital technology, and empowering the cultivation of high-quality technical and skilled talents [1]. As the core carrier of vocational education, higher vocational education urgently needs to deeply integrate digital technologies such as virtual simulation, artificial intelligence, and big data into the whole process of discipline teaching, promote the iterative upgrading of teaching methods, and effectively adapt to the dual needs of vocational education reform and digital development in the new era.

Under the guidance of the national strategy of building a strong maritime country, China's shipping industry is accelerating its transformation toward intelligence, internationalization, and greening. Post scenarios such as intelligent ship operation, international maritime communication, cross-cultural emergency disposal, and port foreign trade docking are becoming increasingly complex, posing stricter requirements for practitioners' situational application ability of maritime English and digital operation ability. As a core basic course for maritime majors, maritime English is a key link connecting professional knowledge and post practice. Its teaching quality is directly related to the training level of maritime talents, thereby affecting the international development process of China's shipping industry. In line with the latest requirements of the International Maritime Organization (IMO) Standards for Maritime English (SMCP) on the language competence of maritime practitioners, the situational application ability of maritime English has become one of the core assessment indicators for crew competency examinations and

international route employment, further highlighting the practical necessity of this teaching reform.

At present, there are obvious shortcomings in the situational teaching of maritime English in higher vocational colleges: the application of situational teaching methods mostly stays at the shallow level such as classroom simulated dialogues and role-playing, lacking in-depth design of complex post scenarios such as ship emergency disposal and international maritime conference communication; the integration of digital technology and situational teaching method is relatively superficial, mostly as an auxiliary means for courseware display and video playback, failing to effectively empower the whole process of situational teaching design, implementation, and evaluation. This teaching model is not only difficult to stimulate students' learning initiative, but also unable to effectively cultivate students' ability to use English to solve practical problems in real post scenarios, restricting the improvement of maritime English teaching quality and being obviously out of line with the needs of high-quality development of the shipping industry. In this context, carrying out research on the reform of situational teaching method of maritime English in higher vocational colleges empowered by digitalization has important theoretical value and practical significance. Accordingly, solving the pain points of situational teaching of maritime English in higher vocational colleges and promoting the deep integration of digital technology and situational teaching method have become key starting points to adapt to the high-quality development of the shipping industry and implement the policy of digital transformation of vocational education, which is also the core starting point of this research.

2. Research Status at Home and Abroad

2.1. Foreign Research Status

Foreign research on maritime English teaching started relatively early, focusing on situational teaching practice centered on the IMO SMCP, and has formed a relatively mature teaching model and research system [2]. Foreign research always adheres to industry demand orientation, pays attention to the deep integration of real work scenarios of maritime posts and English teaching, highlights the cultivation of students' practical application ability, and constructs a closed-loop research framework of "industry demand-teaching design-practice verification-optimization and improvement".

With the rapid iteration of digital technology, foreign scholars have focused their research on the application of digital means such as virtual simulation, online situational simulation, and AI voice evaluation in maritime English teaching, further deepening the reform of situational teaching. Smith et al. (2022) used virtual simulation technology to build immersive teaching scenarios such as ship bridge and engine room, carried out special teaching of maritime English emergency communication, and effectively improved students' situational application ability and emergency disposal ability [3]. Some foreign colleges and universities have established in-depth cooperation with shipping enterprises to jointly build a digital situational teaching resource library, integrating core contents such as ship operation procedures and international maritime communication norms into digital situations, realizing the seamless connection between teaching content and post needs.

It should be noted that there are still significant differences between foreign relevant research results and the school-running orientation of China's higher vocational education and the talent demand of maritime posts. Foreign higher vocational maritime education focuses on cultivating technical application-oriented talents, and its teaching mode and resource allocation are in line with the development characteristics of their own shipping industry. However, China's higher vocational maritime education should not only meet the needs of post skills, but also conform to the strategic orientation of building a strong maritime country. Therefore, foreign research results cannot be directly copied and applied, and need to be localized and optimized combined with the reality of China's higher vocational maritime education.

2.2. Domestic Research Status

In recent years, domestic scholars have carried out a lot of research on the reform of situational teaching method of maritime English in higher vocational colleges and the application of digital teaching, forming a number of phased achievements with practical value. The research core mainly focuses on two directions: one is the innovative application and model optimization of situational teaching methods, and the other is the exploration of the integration path of digital technology and situational teaching.

In terms of the innovation of situational teaching methods, scholars focus on exploring post-oriented situational design ideas and teaching model reform, emphasizing the teaching concept of "integrating learning with application, unifying knowledge and practice". Zhang Min (2023), from the perspective of industry-education integration, proposed integrating maritime industry standards and real post

scenarios into situational teaching design to improve the post adaptability of teaching content, and explored and formed a situational teaching reform path suitable for maritime English in higher vocational colleges [4]; Chen Ming (2023) tried to construct an online-offline mixed situational teaching mode, which effectively enhanced the interest and effectiveness of maritime English teaching by combining online teaching platforms and offline classroom practice [5].

In terms of the integration of digitalization and situationalization, scholars focus on the application of virtual simulation, artificial intelligence and other technologies, striving to break through the limitations of traditional situational teaching such as difficult scene restoration and weak interactivity. Zhao Yang (2022), combined with IMO SMCP, developed targeted digital situational teaching resources for maritime English and constructed virtual simulation teaching scenarios, effectively solving the problem that real post scenarios are difficult to restore in traditional situational teaching [6]. Li Juan (2022) conducted research on the reform path of digital empowerment for higher vocational English for specific purposes teaching, and proposed using digital technology to optimize the whole process of situational teaching to improve the accuracy and effectiveness of teaching implementation [7].

Although domestic research has made certain progress, there are still obvious deficiencies: first, the integration depth of digital technology and situational teaching method is insufficient, mostly staying at the shallow level of "technology-assisted teaching", failing to realize the deep empowerment of the whole process such as situational design, teaching implementation, and effect evaluation; second, situational design is out of line with post reality, lacking the mining and design of complex post scenarios, making it difficult to meet students' post adaptation needs; third, there is a lack of systematic reform paths and sufficient practical verification, a perfect reform system has not yet been formed, and the popularization of research results is not strong [8]. In addition, existing research pays insufficient attention to the improvement of teachers' digital literacy, optimization of evaluation system, improvement of guarantee mechanism, etc., which is difficult to support the long-term promotion of situational teaching reform.

3. Current Situation and Main Problems of Situational Teaching of Maritime English in Higher Vocational Colleges

3.1. Research Design and Implementation

To comprehensively and accurately grasp the current situation and core problems of situational teaching of maritime English in higher vocational colleges, this paper adopts questionnaire survey and interview methods to carry out special research. The research selects 6 higher vocational colleges offering maritime majors in China (covering eastern, central and western regions) and 8 representative shipping enterprises (including COSCO Shipping, China Merchants Port, etc.) as research objects. The research scope covers 42 maritime English teachers, 316 maritime major students, 15 human resource managers and front-line crew members of shipping enterprises, ensuring the representativeness and comprehensiveness of the research results. (See Table 1)

A total of 42 teacher questionnaires and 316 student

questionnaires were distributed, with 40 valid teacher questionnaires and 308 valid student questionnaires recovered, with effective questionnaire recovery rates of 95.2% and 97.5% respectively; 32 in-depth interviews were conducted (including 10 teachers, 12 students, 10 industry experts), and 32 valid interview records were recovered. The

survey data were statistically analyzed by SPSS software, and systematically summarized and refined combined with interview records to sort out the current situation and core problems of situational teaching of maritime English in higher vocational colleges.

Table 1. Composition of Research Objects

Type of Research Objects	Specific Research Objects	Survey Quantity	Remarks
Higher Vocational Colleges	Higher vocational colleges offering maritime majors in China	6 (covering eastern, central and western regions)	Covering different regions to ensure representativeness
Shipping Enterprises	Representative shipping enterprises (including COSCO Shipping, China Merchants Port, etc.)	8	Covering mainstream enterprises in the industry, in line with post reality
Respondents	Maritime English Teachers	42 (40 valid questionnaires)	Effective recovery rate 95.2%
Respondents	Maritime Major Students	316 (308 valid questionnaires)	Effective recovery rate 97.5%
Respondents	Enterprise HR Managers & Front-line Crew	15	Participated in in-depth interviews

3.2. Current Teaching Situation

The survey results show that situational teaching of maritime English in higher vocational colleges has been initially carried out, but the overall application level is not high, and the integration depth of digital technology and situational teaching is insufficient, showing the following three characteristics:

First, the application of situational teaching methods is superficial. 87.5% of higher vocational colleges have introduced situational teaching methods into maritime English teaching, but mainly focus on classroom simulated dialogues and simple role-playing, focusing on basic post scenarios such as ship greeting, cargo handover, and port quarantine; only 22.5% of teachers can design complex post scenarios such as ship emergency disposal and international maritime communication, and the teaching form is relatively single, lacking immersive and interactive experience, so the application value of situational teaching methods has not been fully exerted.

Second, the penetration level of digital technology is shallow. 75.0% of higher vocational colleges have introduced digital means such as multimedia courseware and online teaching platforms (e.g., Chaoxing Fanya, Xuexitong) to assist situational teaching; however, digital technology is mostly used as an auxiliary tool for situation display, video playback, and homework assignment, without deeply participating in the whole process of situational teaching design, implementation, and effect evaluation; only 17.5% of colleges have built a virtual simulation teaching platform for maritime English, and 20.0% of teachers use AI technology for English voice evaluation and situational dialogue guidance, so the empowering role of digital technology has not been fully released.

Third, the post-oriented awareness needs to be strengthened. 67.5% of teachers have begun to connect with maritime post needs in situational design, integrating basic post terms and operation procedures; however, due to the lack of front-line industry practice experience and insufficient guidance from industry experts for some teachers, situational design is far from real maritime post scenarios, mostly “simulated” rather than “real”. Only 25.0% of situational teaching content is strictly in line with IMO SMCP and

maritime post skill requirements, and the post adaptability of teaching content needs to be further improved.

3.3. Main Existing Problems

Combined with survey data and interview records, there are four core problems in situational teaching of maritime English in higher vocational colleges, which seriously restrict the improvement of teaching quality and talent training quality:

First, the adaptability of situational teaching methods is insufficient. Situational design mostly focuses on basic post scenarios, lacking the mining and design of complex post scenarios such as ship emergency disposal, international maritime conference communication, and cross-cultural conflict resolution, which is out of line with the actual needs of the shipping industry; the teaching form is relatively single, mainly “teacher-guided, student-simulated”, lacking immersive and project-based practice links, making it difficult to stimulate students’ learning initiative and participation; meanwhile, situational design does not take into account students’ hierarchical needs, and does not design different levels of teaching scenarios according to students’ English foundation and professional ability, resulting in students with weak foundation being difficult to adapt and students with strong ability not being fully improved.

Second, the integration of digitalization and situational teaching methods is not in-depth. The application of digital technology mostly stays at the shallow auxiliary level, not participating in the whole process of situational teaching design, implementation, and effect evaluation, failing to achieve the core goal of “technology empowering teaching”; high-quality and targeted digital situational resources are relatively scarce, and existing resources are mostly general content, not specially developed in combination with the teaching objectives and post characteristics of maritime English in higher vocational colleges; some teachers lack the ability to apply digital tools, making it difficult to deeply integrate virtual simulation, AI, big data and other technologies with situational teaching, and unable to give full play to the empowering value of digital technology.

Third, teachers’ digital teaching literacy is insufficient. 45.0% of maritime English teachers lack relevant abilities such as virtual simulation platform application, digital situational resource development, and AI teaching tool use,

making it difficult to independently design and implement digital situational teaching; 60.0% of teachers have not carried out research activities in front-line posts such as ships and ports, and their grasp of real work scenarios, industry standards, and language application norms of maritime posts is not accurate, affecting the post adaptability of situational design; 37.5% of teachers are still influenced by traditional teaching modes, with relatively backward teaching concepts, insufficient understanding of digital situational teaching, and lack of awareness and ability of active innovation.

Fourth, the teaching evaluation system is imperfect. 77.5% of higher vocational colleges still focus on outcome evaluation, emphasizing students' final English examination results, ignoring the process evaluation of students' situational application ability of maritime English, digital learning ability, and practical operation ability [9]. The evaluation indicators are relatively vague, a clear three-dimensional evaluation index system of "situational application ability + digital learning ability + post adaptation ability" has not been constructed, the scoring standards are not detailed enough, and the evaluation results lack objectivity and pertinence; the evaluation subjects are relatively single, and shipping enterprise experts and front-line crew members are not introduced to participate in the evaluation, so the evaluation results are difficult to truly reflect students' post adaptation ability and cannot meet the needs of industry talent training.

4. Reform of Situational Teaching Method of Maritime English

4.1. Reform Principles

Combined with the actual teaching of maritime English in higher vocational colleges, maritime post needs and digital development trends, this situational teaching method reform strictly follows four core principles to ensure the scientificity, practicality and operability of the reform path and promote the effective implementation of the reform:

First, the post-oriented principle. Closely connect with the post needs of the shipping industry and IMO SMCP, thoroughly sort out the language application norms and skill requirements of core post scenarios such as ship navigation, port operation, emergency disposal, and international communication, ensure that all links such as situational design, digital resource development, and teaching implementation are in line with real post needs, realize "teaching scenarios connecting post scenarios, teaching objectives connecting post abilities", and effectively improve the post adaptability of talent training.

Second, the digital empowerment principle. With digital technology as the core support, digital means such as virtual simulation, artificial intelligence, big data, and online teaching platforms are fully integrated into the whole process of design, implementation, evaluation and optimization of situational teaching methods, realizing immersive, personalized and precise situational teaching, effectively breaking through the limitations of traditional situational teaching, giving full play to the empowering role of digital technology, and promoting the iterative upgrading of maritime English teaching methods.

Third, the principle of integrating learning with application. Adhere to the teaching concept of "learning in situations, applying in practice", take students as the main body, guide students to take the initiative to use maritime English

knowledge and professional skills to solve practical problems through various ways such as digital situational experience, interactive practice, and project-based promotion, realize "integrating learning with application, unifying knowledge and practice", constantly stimulate students' learning initiative and participation, and improve students' practical application ability [10].

Fourth, the principle of practicality and innovation. Combined with the school-running conditions of higher vocational colleges, teachers' teaching literacy and students' learning characteristics, construct a simple, replicable and popularized situational teaching method system to ensure that reform measures can be implemented and achieve effective results; meanwhile, actively innovate the integration mode of digital technology and situational teaching methods, break through traditional teaching bottlenecks, highlight the practice orientation and post orientation of higher vocational teaching, and reflect the innovation and foresight of the reform.

4.2. Specific Reform Paths

4.2.1. Digital Empowerment for Situational Design, Constructing a Post-oriented Hierarchical Situational System

Jointly with shipping enterprise experts, front-line crew members and maritime English teachers, combined with IMO SMCP, systematically sort out core post scenarios such as ship navigation, port operation, emergency disposal, international maritime communication, and cross-cultural communication, and extract language application norms and skill requirements of different post scenarios. Combined with students' cognitive rules and differences in English foundation, teaching situations are divided into three levels: basic situations, improvement situations, and complex situations, with clear teaching objectives and ability requirements for each level: basic situations focus on simple scenarios such as ship greeting and cargo handover, focusing on cultivating students' basic language application ability; improvement situations focus on conventional scenarios such as port quarantine and ship scheduling, focusing on cultivating students' conventional situational application ability; complex situations focus on complex scenarios such as ship emergency disposal and international maritime conference communication, focusing on cultivating students' complex situational application ability and cross-cultural communication ability.

With the help of digital technologies such as virtual simulation and VR/AR, jointly with shipping enterprises and digital technology companies, accurately restore real post scenarios such as ship bridge, engine room, port wharf, and maritime conference room to create immersive teaching scenarios, allowing students to experience "immersive" situations; intuitively display the operation procedures, language application norms and precautions of complex post scenarios through digital forms such as animations and short videos; use AI technology to simulate dialogue scenarios of different post roles to realize interactive situational simulation and improve students' participation. Meanwhile, integrate hierarchical situational materials, jointly develop digital teaching resources such as situational micro-lectures, dialogue templates and operation videos with industry experts, digital technicians and maritime English teachers, build a clear and resource-rich situational resource library for maritime English, classify and archive by levels, and realize

resource sharing and dynamic update.

4.2.2. Digital Empowerment for Teaching

Implementation, Innovating Diversified Situational Teaching Modes

Implement an immersive virtual situational teaching mode. Relying on the virtual simulation teaching platform of maritime English, organize students to carry out immersive situational practice activities, such as simulating English communication in ship emergency disposal, speeches and negotiations in international maritime conferences, etc. Students play post roles through relevant equipment, and teachers monitor and guide in real time to improve students' situational application ability and emergency disposal ability.

Construct an online-offline mixed situational teaching mode. Use online teaching platforms to assign situational preview tasks and push learning resources such as situational materials and language norms to help students familiarize with situational connotations and language application requirements in advance; focus on interactive situational simulation and group cooperation inquiry in offline classrooms, use AI voice evaluation tools to correct students' language expression errors in real time and improve students' language standardization; assign situational expansion tasks through online platforms after class to extend the teaching chain, realize the closed-loop teaching mode of "online preview-offline practice-online expansion" and improve teaching effectiveness.

Implement a project-based situational teaching mode. Taking actual work projects of maritime posts as carriers, such as "situational practice of the whole process of ship cargo handover" and "situational practice of ship emergency disposal", guide students to complete tasks such as situational design, role-playing and achievement display in groups by using digital situational resource libraries and virtual simulation teaching platforms, cultivating students' teamwork ability, practical application ability and problem-solving ability.

4.2.3. Digital Empowerment for Teachers' Literacy, Building a "Digital + Double-qualified" Teacher Team

Carry out systematic digital teaching training. Regularly organize maritime English teachers to participate in special training such as virtual simulation platform application, digital situational resource development, and AI teaching tool use, invite digital technology experts and excellent front-line teachers to carry out special lectures and practical guidance; build a communication platform for teachers' digital teaching, encourage teachers to share teaching experience and exchange teaching insights, establish and improve the assessment mechanism of teachers' digital teaching ability, incorporate digital teaching ability into teachers' assessment and evaluation system, and stimulate teachers' enthusiasm and initiative to improve digital literacy.

Deepen the school-enterprise collaborative research mechanism. Jointly build teacher practice bases with shipping enterprises, regularly organize maritime English teachers to carry out research activities in front-line posts such as ships and ports, accumulate industry practice experience, and accurately grasp real post scenarios and industry standards; invite shipping enterprise experts to campus to guide teachers in situational design and resource development, implement the "teacher + industry expert" pairing assistance mode, and improve the post adaptability of teachers' situational design.

Form a collaborative teaching team of "maritime English

teachers + industry experts + digital technicians", clarify the division of responsibilities of team members, jointly carry out teaching reform discussion, digital resource development, teaching practice guidance and other work, promote teachers' collaborative growth, and comprehensively improve teachers' digital teaching ability, industry practice ability and comprehensive teaching level.

4.2.4. Improving the Evaluation and Guarantee System to Ensure the Effective Implementation of the Reform

Construct a diversified situational evaluation mechanism. Improve the three-dimensional evaluation index system of "situational application ability + digital learning ability + post adaptation ability", refine the scoring standards of each index to enhance the objectivity and pertinence of evaluation; adopt a comprehensive evaluation method of "process evaluation (60%) + outcome evaluation (40%)", use online teaching platforms and big data technology to track students' learning process in real time, automatically generate process evaluation data, and comprehensively reflect students' learning attitude, situational application ability and digital learning ability; use AI technology to accurately evaluate students' language expression and operation procedures; introduce school teachers, industry experts and enterprise tutors to participate in the evaluation together, and encourage students to conduct self-evaluation and group mutual evaluation to ensure that the evaluation results can truly reflect students' post adaptation ability and meet the needs of industry talent training.

Improve the reform guarantee system to provide strong support for situational teaching reform: first, policy and system guarantee, connect with relevant national policy requirements, formulate school-level reform implementation rules, establish and improve digital teaching management systems, school-enterprise collaborative education systems, teacher training systems, etc.; second, funding and facility guarantee, increase funding investment, set up special reform funds for digital infrastructure construction, digital resource development, teacher training and other work; third, school-enterprise collaboration guarantee, deepen in-depth cooperation with shipping enterprises, jointly build teaching practice bases and digital situational resource libraries, establish an industry demand feedback mechanism, timely connect with new needs of industry development, and promote teaching content to resonate with industrial development.

4.3. Reform Practice Verification

To verify the effectiveness of the reform of situational teaching method of maritime English in higher vocational colleges empowered by digitalization, 120 students majoring in maritime technology of Grade 2022 in a higher vocational college were selected as practice objects, divided into experimental group (60 students, adopting the digital empowered situational teaching method constructed in this paper) and control group (60 students, adopting traditional situational teaching method), and a one-semester teaching practice was carried out.

The practice results show that the average final English score of the experimental group is 82.3 points, and the passing rate of situational application ability test is 93.3%, which are 12.0% and 30.1% higher than those of the control group (average score 73.5 points, passing rate 71.7%) respectively, and the differences are statistically significant ($P < 0.05$). (See

Table 2) Questionnaire survey and interview results show that 88.3% of students in the experimental group believe that digital situational teaching can effectively stimulate learning initiative, and 85.0% of students believe that their situational application ability and post adaptation ability of maritime English have been significantly improved, both proportions are significantly higher than those of the control group; the maritime English teachers participating in the practice have significantly improved their digital teaching literacy, situational design ability and comprehensive teaching ability. During the period, 42 digital situational teaching resources and 8 virtual simulation teaching cases were successfully developed, forming 3 replicable and popularized digital empowered situational teaching modes. The above practice results fully verify that the reform path of situational teaching method of maritime English in higher vocational colleges empowered by digitalization has strong practicality and operability, can effectively break through the pain points of traditional teaching, and significantly improve teaching quality and talent training quality.

5. Conclusion

Against the dual background of digital transformation of vocational education and high-quality development of the shipping industry, core problems such as insufficient adaptability of teaching methods, in-depth digital integration, insufficient support of teachers' literacy, and imperfect evaluation system in situational teaching of maritime English in higher vocational colleges seriously restrict the improvement of teaching quality and talent training quality; digital technology can effectively solve the above teaching pain points. By constructing a post-oriented hierarchical situational system, innovating diversified situational teaching modes, improving teachers' digital literacy and perfecting the evaluation and guarantee system, students' situational application ability and post adaptation ability of maritime English can be significantly improved, promoting the high-quality development of maritime English teaching.

The reform path of situational teaching method empowered by digitalization constructed in this paper is in line with the actual teaching and industry needs of maritime English in higher vocational colleges, with strong practicality and operability, and can be popularized and applied in similar higher vocational colleges. In the future, combined with the

new needs of intelligent and international development of the shipping industry, we will further deepen the integration depth of digital technology and situational teaching methods, continuously optimize the reform path, enrich digital teaching resources, cultivate more high-quality technical and skilled talents with digital literacy and situational application ability for the shipping industry, and help build a strong maritime country.

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