



Oceanology: Implications for the Field of Education in the Maritime World

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Abstract: This article discusses the importance of education in the maritime industry, particularly its implications for maritime education. This research adopts a comprehensive mixed methodology to analyze the influence of language in marine education and maritime industry practices at large. The methodology includes three main components: surveys, in-depth interviews, and document analysis, providing a holistic view of language dynamics in the maritime sector. This article highlights the challenges in marine education concerning language teaching and proposes the integration of language learning into the curriculum. The aim is to increase the effectiveness of maritime education and ensure more excellent safety at sea. With a focus on developing language learning strategies, this article proposes approaches to address the linguistic skills gap among seafarers, support maritime safety, and strengthen international cooperation in the marine industry.

Keywords: Education; Oceanology; Maritime; World

Introduction

The maritime industry, the backbone of global trade, relies heavily on communicating effectively amidst linguistic and cultural diversity. Considering that this industry is responsible for the transportation of more than 90% of merchandise worldwide, the importance of language cannot be ignored (Gazzola et al., 2020; James et al., 2018; Riyanto et al., 2023; Tabidze & Beridze, 2019). Language facilitates coordination and cooperation among crew members from different countries with different linguistic backgrounds. This is the key to smooth and efficient operations, enabling the correct exchange of information and fast and accurate decision-making in both every day and emergencies (Chehade et al., 2019; Petrashchuk, 2019; Zhang & Sarcevic, 2018)

However, this linguistic diversity also brings challenges. Misunderstandings and ineffective communication can quickly occur, increasing the risk of human error leading to accidents or material loss. In this context, language skills become more than just a

communication tool. Thus, understanding and overcoming language barriers in the maritime industry not only supports smooth global trade but also improves safety at sea, highlighting the importance of language education and training specifically tailored to the unique needs of the maritime industry (Dacwag, 2018; Kovacic & Cunningham, 2019).

In the vast and complex scope of the maritime industry, language is a vital tool that ensures smooth communication between personnel and compliance with international standards, security and operational procedures. English, mainly International Maritime English (SMCP), has been widely adopted as a communication standard, enabling ship crews and maritime professionals from different countries to interact and exchange critical information clearly and effectively (Balderas & Losey-Leon, 2018; Denc & Denc, 2019; Valentyna & Iryna, 2019). The ability to understand and use SMCP is not only essential for running day-to-day operations but also critical in emergencies, where proper communication can be the

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deciding factor between safety and disaster (Ahmmed, 2020; Chirea-Ungureanu, 2021; Vicheva, 2022).

The adoption of International Maritime English as the lingua franca of the maritime industry reflects recognition of the need for consistent and reliable communication standards worldwide. This emphasizes the importance of language education and training for seafarers and naval professionals as a prerequisite for safe and effective operations. Mastery of this language enables a better understanding of international regulations, technical documentation and safety procedures, minimizing the risk of misunderstandings and increasing the ability to respond effectively in urgent situations. As such, language education becomes a key component in preparing maritime professionals to support naval safety and operational sustainability in this highly globalized industry.

Collaboration between various stakeholders in the maritime industry is critical to achieving practical and relevant language learning standards. Maritime educational institutions, regulatory bodies, and shipping companies must work together to design curricula that meet academic standards and the industry's practical needs. These initiatives should include developing appropriate learning materials, innovative teaching methodologies, and assessment systems capable of accurately measuring students' language competency. Close collaboration can create a comprehensive language learning program, improving seafarers' communication skills and ensuring they know what is necessary to comply with international regulations and manage emergencies wisely (Ahmmed et al., 2020; Filonenko et al., 2023; Sari, 2023; Tymoshchuk, 2019).

Given the complexity and risks associated with maritime operations, the importance of good language education cannot be underestimated. By paying sufficient attention to communication aspects in maritime training curricula, the industry can move towards a future where safety and efficiency are top priorities. Thus, language learning is not just about mastering words and grammar but about building strong communication bridges between sailors from different backgrounds, ensuring that each crew member can contribute maximally to the safety and successful operation of the ship.

Applying advanced technologies such as simulation and virtual reality in language learning opens new maritime training opportunities, improving education quality and effectiveness. This technology allows the creation of scenarios similar to natural conditions at sea, allowing seafarers to hone their communication skills in diverse and often challenging situations (Belev & Daskalov, 2019; Hopcraft, 2021). In this way, seafarers learn the language in a theoretical

context and gain valuable practical experience, better preparing them to face the challenges that may occur during maritime operations.

The benefits of using this learning method are very significant for individuals in improving language skills and the safety and efficiency of maritime operations globally. Seafarers skilled in languages can better manage emergencies, comply with international regulations, and collaborate effectively with crew members from different cultural backgrounds. This directly contributes to reducing the risk of accidents and incidents at sea, demonstrating how technology-enriched language education can have a far-reaching positive impact on global maritime and operational safety (Baric et al., 2018; Frias et al., 2022).

Language integration in maritime education removes communication barriers and fosters intercultural understanding and respect among seafarers from different countries (Chau & Truong, 2018; Guryanov et al., 2019; Susanti et al., 2023). In the global maritime industry context, where daily interactions involve people from diverse cultural backgrounds, the ability to communicate effectively becomes essential. Moreover, effective language education must also instil awareness of the values and norms of different cultures, strengthen teamwork and ensure the success of maritime operations (Bahasoan et al., 2023; Drazhan, 2022; Ratih & Halimi, 2020)

This article shows how important language and cross-cultural communication are in overcoming some of the biggest challenges in the maritime industry, including safety and operational efficiency. By introducing innovative and integrated language learning approaches into the maritime education curriculum, a safer and more productive working environment at sea can be created. This approach improves seafarers' communication skills and deepens their understanding of the importance of intercultural cooperation and respect, increasing the safety and efficiency of the world's oceans.

Method

In this research, the chosen methodology is designed to comprehensively collect and analyze data regarding language use in maritime education and industry practices. This approach involves surveys, in-depth interviews, and document analysis, each of which provides unique insights into language dynamics in maritime contexts (Gabel, 2020; Jain, 2021; Jiun-lung, 2018). The survey was designed to collect quantitative data from a large number of respondents, enabling statistical analysis of perceptions, needs and experiences related to language use in the maritime environment

(Alibakhshi et al., 2021; Francesco Bellusci & Gilyong Han, 2019; Lin et al., 2022)

In-depth interviews were conducted with various stakeholders in the maritime industry, including seafarers, educators at maritime educational institutions, and other professionals involved in naval operations. These interviews aim to gain a deeper and more nuanced understanding of how language is used in everyday practice, the challenges faced in communication, and the effectiveness of currently implemented language learning approaches. It provides rich qualitative data, offering deep insight into the complexities of language use in maritime contexts (Herdawan et al., 2021; Lukas & Yunus, 2021).

Document analysis examines relevant written materials, such as maritime education curriculum books, industry policies and regulations, and operational documents. This approach intends to understand the official and structural context of language use in the marine industry, including the standards for communication and operations. By evaluating these documents, research can identify gaps between policy and practice, as well as propose potential areas for improvement in language teaching and training (Haring Biel et al., 2020; Kanyimo & Ziyambi, 2022; Zhai, 2019).

This combination of survey techniques, interviews, and document analysis allows the research to provide a complete and layered picture of the role of language in the maritime industry and maritime education. This approach not only reveals how the language is currently used and taught but also highlights areas where changes or improvements can be made to support naval safety, operational efficiency and better intercultural cooperation (Elmin, 2021; Fareen, 2018; Mercado et al., 2018; Saray et al., 2021)

The results of this methodology are expected to provide evidence-based recommendations for developing maritime education curricula and operational practices in the marine industry. By focusing on language use as a critical factor for success and safety in naval operations, this research aims to provide insights that can help refine and strengthen language education and training in maritime contexts, enriching both the educational environment and industrial practice.

Result and Discussion

Research Results

This research revealed significant gaps in mastery of International Maritime English (SMCP) among maritime education students despite the language being recognized as standard within the industry. Data analysis shows that these challenges hinder the learning process and disrupt effective communication, a critical

component for safety and efficiency in maritime operations. These challenges are compounded by a lack of appropriate learning materials and effective teaching methods, which create difficulties for instructors in conveying this complex and essential language knowledge to students with diverse language ability backgrounds.

In addition, this research highlights the pressure students feel due to heavy study loads and lack of support in developing their language skills. Difficulty understanding technical terms and using the language practically in a maritime context affects their academic performance and lowers their confidence in communicating professionally. These findings indicate an urgent need to revise maritime education curricula, focusing on developing more inclusive and adaptive language learning strategies to accommodate students' language abilities, strengthening their foundation in effective naval communication.

Language skills are essential to effective communication in the highly technical and global maritime industry. However, substantial challenges arise in maritime educational institutions that struggle to provide adequate language learning materials and teaching methods. These difficulties are exacerbated by limited resources and time, hampering efforts to adapt the learning process to the individual needs of students with varying levels of language proficiency (Fitria, 2023; Kegalj et al., 2023; Nazirova et al., 2023; Wang, 2023). This situation demands a more innovative and flexible approach to language teaching, which targets increasing linguistic competence and considers the diversity of students' learning needs.

On the other hand, students experience significant pressure due to high study loads and lack of support in honing their language skills, especially in mastering and applying complex maritime technical terms in practice. Their frustration and lack of confidence in using the language professionally add to their psychological burden, potentially interfering with their academic progress and preparation for the maritime workforce. These challenges highlight the urgent need for more supportive and adequate educational strategies to facilitate effective language learning and increase students' confidence in communicating professionally (Aloia & McTigue, 2019; Khasawneh, 2021; Omosehin & Smith, 2019; Pascoe et al., 2020)

Addressing this issue requires a holistic change in how languages are taught in maritime educational institutions, emphasizing the development of more relevant and engaging learning materials and teaching methods that promote authentic language interactions and practices. A more personalized approach to teaching, which considers individual differences in learning pace and style, could be a solution to increase

the effectiveness of language learning (Alharbi, 2021; Gunathilaka, 2018; Shemshack et al., 2021). This will not only help students master the linguistic skills necessary for success in the maritime industry but also build their confidence in using the language in a professional context.

Additionally, increased support and resources for students, including the use of language learning technology and access to language practice in real-world scenarios, can strengthen their ability to apply language knowledge in actual work situations (Kessler, 2018; Kurmanova & Kapantaikyzy, 2023; Smith, 2019; Wang et al., 2022). Thus, developing creative and comprehensive solutions to language learning challenges in maritime education will enhance students' linguistic competence and better prepare them to contribute effectively and professionally to the global marine industry.

Research findings indicate an urgent need to reform maritime education curricula to be more inclusive and adaptive, allowing for accommodation of students' varying levels of language proficiency. To achieve this goal, one of the key findings is the need for significant improvements in teacher training, especially for those teaching maritime languages. By providing access to comprehensive professional training, instructors can be enriched with new, more effective teaching skills and techniques, enabling them to engage student interest and support active learning (Ruder & Stanford, 2018; Silva, 2023; Tian, 2018). This training will arm instructors with the strategies necessary to overcome complex language learning challenges, ensuring they can deliver material more effectively and adapt their teaching methods to meet diverse learning needs (Gao et al., 2022; Perminova et al., 2021).

Applying innovative and participatory teaching methods is also crucial in promoting student engagement in language learning. Methods such as project-based learning, simulations, and language games can encourage students to use language in authentic contexts, increasing their understanding of practical language use (Drumhiller et al., 2021; Kondratieva et al., 2021; Shcherbyna et al., 2022). Such initiatives strengthen language skills and build students' confidence in communicating professionally, equipping them with the tools necessary to succeed in their maritime careers (Chernikova et al., 2020; Ihnatenko, 2018).

Finally, strengthening the maritime education curriculum with a more student-focused approach and skills-based language learning is essential. Maritime educational institutions can create more supportive and effective learning environments by placing improved teacher training and participatory and innovative teaching methods at the center of learning strategies. This approach will correct deficiencies in language

learning and prepare students more holistically for the challenges and needs of the dynamic global maritime industry.

Implications for the Education Sector

The findings of this research reveal the importance of effectively integrating language courses into maritime education programs to overcome the communication challenges often faced by seafarers in a global environment. Language courses explicitly designed for the maritime industry can help improve seafarers' communication skills, ensuring they can operate effectively and safely in various conditions. Strong language skills are essential for navigation and daily operations, managing emergencies, and complying with international regulations.

In developing integrated language courses, maritime educational institutions must focus on industry-specific needs, incorporating maritime technical terms, safety communications, and intercultural communication practices. This approach ensures that students learn the language and its practical application in a naval context. This will prepare them for various scenarios at sea, improving their ability to communicate clearly and effectively with international crews, port authorities and others.

Additionally, language training for seafarers must go beyond classroom learning by integrating modern learning technologies, such as distance learning and e-learning platforms. This technology allows seafarers to continue their language learning flexibly throughout their careers, fitting into busy and often irregular work schedules. This is vital to ensure that seafarers can continue to develop and update their language skills in line with changing industry standards and needs (Mori & Manuel, 2023; Sokolov et al., 2020; Widiatmaka et al., 2022; Yurzhenko & Kononova, 2023)

Establishing a comprehensive and ongoing assessment system that monitors the progress and effectiveness of language learning among seafarers is also essential. These assessments can help identify additional training needs and provide feedback for ongoing curriculum development. In doing so, educational institutions can adapt their programs to meet evolving industry standards and ensure seafarers have the communication skills necessary to succeed.

Collaboration between academia, the maritime industry and regulatory bodies is also essential to ensure the relevance and quality of marine language education. This collaboration can facilitate the exchange of knowledge and best practices, helping to develop uniform industry standards for language education. Through collaboration, specific training needs can be identified, and course materials developed that meet job

market needs (Chyzykova, 2021; de Hei et al., 2020; Martynenko & Aleshko-Ozhevskaya, 2022).

Investment in educator training is no less critical. Teachers and instructors must have the latest skills and knowledge about the maritime industry and effective language teaching methods. Ongoing professional training for educators will ensure that they can provide high-quality language teaching relevant to the needs of the marine sector (Moroz, 2021; Puspitasari et al., 2020).

By implementing these recommendations, maritime education can significantly improve seafarers' language competency, enhancing safety and operational efficiency in the marine industry. An emphasis on practical, relevant and ongoing language learning will prepare seafarers to meet the communication challenges of their careers, ensuring that they can contribute effectively to the safety and success of global maritime operations.

Through this holistic approach, maritime education can respond to global challenges by providing a workforce competent in the technical aspects of marine work and able to communicate effectively in a multilingual and multicultural environment. This improves individual career prospects and strengthens safety and efficiency across the maritime industry, underscoring the importance of language as a fundamental skill in marine education and training.

Conclusion

Effective integration of language learning into the maritime education curriculum is a crucial step to meet the global communication needs of the marine industry. The industry can better meet operational and safety challenges by paying attention to language use, mainly through developing courses designed to strengthen seafarers' communication skills. An approach to language learning that focuses not only on technical terminology but also on intercultural communication and safety practices can significantly improve the quality of education provided to prospective seafarers, preparing them not only to face the daily challenges at sea but also to play an active role in promoting maritime safety. The importance of language in maritime education is limited to improving communication and safety, seafarers' professional development, and the maritime industry's overall operational efficiency. By providing students and naval professionals with strong language skills, maritime education contributes to the establishment of a safer and more productive work environment. This, in turn, supports the growth and sustainability of the global marine industry, reaffirming that language cultivation and mastery are essential components of an effective maritime education curriculum.

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Conflicts of Interest

The authors declare no conflict of interest.

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