Impact of english language proficiency on maritime safety and environmental protection

Marudut Bernadtua Simanjuntak[1,2*], *Zainal* Rafli[2], and *Sintowati Rini* Utami[2]

[1]Lecturer and Researcher, Sekolah Tinggi Ilmu Pelayaran- Jakarta, Indonesia
[2]Doctoral Program, Postgraduate Degree, 13950 State University of Jakarta, Indonesia

Abstract. This study investigates the influence of English language proficiency on maritime safety practices and environmental protection among senior cadets in vocational maritime education. The research focuses on communication skills development, particularly speaking and listening competencies, essential for effective operational practices in the maritime industry. Using qualitative methods, including semi- structured interviews and observational techniques, the study examines how enhanced language proficiency enhances cadets' abilities to adhere to safety protocols, communicate effectively with international stakeholders, and engage in environmental stewardship. Results indicate that cadets proficient in English demonstrate advanced fluency and technical vocabulary usage, contributing to improved safety outcomes and sustainable practices within maritime operations. The findings underscore the significance of integrating English for Specific Purposes (ESP) into vocational curricula to prepare future maritime professionals adequately. This research not only highlights the critical role of language education in maritime training but also advocates for continuous improvement in educational strategies and industry standards to uphold safety and environmental regulations.

1 Introduction

The maritime industry plays a crucial role in global trade and transportation, where effective communication skills are paramount for ensuring operational safety and environmental protection [1]. Within this context, the proficiency in English language among maritime professionals is increasingly recognized as a foundational element that influences bothsafety protocols and environmental stewardship practices. This study delves into the realm of English for Specific Purposes (ESP) within maritime education, specifically focusing on how enhancing communication skills—particularly speaking and listening competencies—among cadets contributes to maritime safety and environmental protection.

The background of this research stems from the evolving demands placed upon maritime cadets, who are not only expected to navigate the complexities of international maritime laws and regulations but also to engage effectively with diverse stakeholders from around the globe [2,3].

* Corresponding author: MarudutBernadtuaSimanjuntak_9906921013@mhs.unj.ac.id

The curriculum designed for cadets in vocational schools, especially those focused on maritime programs, integrates practical and applied English communication as a core component. Thisapproach acknowledges the need for cadets to develop fluency in English that goes beyond mere linguistic competence, emphasizing functional proficiency that supports their roles as future seafarers [4–6].

The objectives of this research are twofold: firstly, to evaluate the impact of enhanced English language proficiency on maritime safety practices, and secondly, to assess its influence on environmental protection efforts within the maritimeindustry. By conducting qualitative research methods such as interviews and observations with senior cadets who havecompleted extensive internships in prominent port and shipping companies, this study seeks to uncover the correlationbetween effective English communication and improved safety outcomes. Furthermore, it aims to explore how proficientEnglish skills contribute to the adoption of sustainable practices that mitigate environmental risks in maritime operations. One of the key gaps identified in current literature is the nuanced understanding of how English language proficiency directly translates into enhanced safety protocols and environmental stewardship within the maritime sector. Whileexisting studies acknowledge the importance of communication in maritime contexts, few delve into the specific impactsof language skills on safety measures and environmental sustainability.

This research intends to bridge this gap byproviding empirical evidence that illustrates the tangible benefits of proficient English communication in fostering safer maritime practices and promoting sustainable environmental initiatives. Moreover, the urgency of this research isunderscored by the pressing need for multidisciplinary approaches to address Environmental, Social, and Governance (ESG) issues in maritime operations.

As global concerns over climate change and marine conservation intensify, integrating effective communication strategies into maritime education becomes imperative for preparing cadets to navigate these complex challenges responsibly. By enhancing their communication competencies, this study aims to equip future maritime professionals with the skills needed to engage in community-based approaches that support resilient ecosystems and sustainable livelihoods. By elucidating the connections between language skills, safety protocols, and environmental sustainability, this research aims to contribute valuable insights that can inform educational practices, policy development, and industry standards within the maritime sector [7,8]. Through rigorous empirical analysis, this study seeks to advance our understanding of how language education can effectively support the overarching goals of safety, sustainability, and stewardship in maritime operations.

2 Methods

The research methodology employed in this study integrates qualitative approaches to explore the impact of Englishlanguage proficiency on maritime safety and environmental protection. Given the nature of the research focus specifically on English for Specific Purposes (ESP) and its application within maritime education the methodology is designed to capture nuanced insights into how communication skills development influences professional practices among maritime cadets. Qualitative research methods were chosen to delve deeply into the experiences and perceptions of senior cadets who have completed extensive internships in leading port and shipping companies [9,10]. These methodsinclude semi-structured interviews and observational techniques, which allow for a rich exploration of cadets' communication practices in real-world settings. By engaging directly with participants, the study aims to gather detailedaccounts of how proficient English communication contributes to their roles as future seafarers,

particularly in terms of enhancing safety protocols and environmental stewardship.

The use of semi-structured interviews facilitates open-ended discussions that encourage cadets to reflect on their communication experiences during internships. This approach not only captures qualitative data on their language proficiency but also elicits insights into the practical applications of their communication skills in diverse maritime contexts. Interviews are conducted in a manner that encourages participants to share specific examples of how effective communication has influenced their interactions with colleagues, superiors, and international stakeholders. Observational techniques complement the interview data by providing firsthand observations of cadets' communication behaviours in situational contexts. Researchers observe cadets during simulated exercises, daily operations, and collaborative tasks to document instances where language proficiency directly impacts operational safety measures and environmental practices[11,12]. This methodological approach enables researchers to triangulate findings from interviews with direct observations, thereby enhancing the credibility and reliability of the study's conclusions.

Data analysis follows a thematic approach, where qualitative data from interviews and observations are systematicallycoded and categorised. Themes emerge organically from the data, allowing researchers to identify patterns, trends, and recurring narratives related to the role of English language proficiency in maritime safety and environmental protection. This thematic analysis process is iterative and reflexive, ensuring that all significant insights are captured and thoroughly explored [13,14]. Furthermore, the qualitative nature of the research allows for a contextual understanding of the complexities inherent in maritime communication practices. By focusing on senior cadets who have undergone intensiveinternship experiences, the study captures insights from individuals who have firsthand knowledge of the challenges andopportunities associated with effective communication in maritime settings.

This participant-centred approach ensures that the research findings are grounded in the lived experiences and perspectives of those directly involved in the industry. The research methodology employed in this study leverages qualitative research methods—specifically semi-structured interviews and observational techniques—to explore the impact of English language proficiency on maritime safety and environmental protection. By adopting a qualitative approach, the study aims to generate nuanced insights that contribute to our understanding of how communication skillsdevelopment can enhance professional practices and support sustainable outcomes within the maritime sector.

3 Findings

The results of this study provide a comprehensive analysis of the impact of English language proficiency on maritimesafety practices and environmental protection among senior cadets who have completed extensive internships in leadingport and shipping companies. The focus remains on communication skills, particularly speaking and listening competencies, as crucial elements influencing professional practices within the maritime industry.

3.1 Communication Skills Development in Maritime Cadets

The study revealed significant advancements in communication skills among senior cadets, attributing their proficiency to rigorous training and practical experiences during internships. Cadets demonstrated a high level of fluencyin English, enabling them to effectively engage with international stakeholders, follow safety protocols, and contribute to environmental

sustainability initiatives. Table 1 illustrates the indicators used to assess communication skills and their respective scoring based on observed competencies.

Table 1. Indicators and Scoring of Communication Skills

Indicator	Scoring Criteria	Analysis
Fluency in Spoken English	1. Limited proficiency 2. Competent 3. Proficient 4. Advanced	Cadets consistently demonstrated proficiency (Score3-4) in speaking English fluently during operational tasks and interactions with diverse stakeholders.
Listening Comprehension	1. Limited understanding 2. Moderate understanding 3. Good understanding 4. Excellent understanding	Cadets exhibited excellent understanding (Score 4) of English in various contexts, enhancing their ability to follow instructions and protocols effectively
Intercultural Communication	1. Minimal interaction 2. Moderate interaction 3. Extensive interaction 4. Highly effective interaction	Effective intercultural communication (Score 3-4) was evident, facilitating smooth collaboration with colleagues and stakeholders from different cultural backgrounds.
Technical Vocabulary	1. Basic 2. Adequate 3. Advanced 4. Specialized	Proficiency in technical vocabulary (Score 3-4) enabled cadets to articulate complex maritime terminology accurately, supporting precise communication in professional contexts.

The results underscored the critical role of English language proficiency in enhancing safety measures within maritimeoperations. Cadets who demonstrated advanced fluency in English were observed to communicate safety procedures effectively, reducing the likelihood of operational errors and incidents. Their ability to convey technical information accurately, as depicted in Table 1, highlights how language competence directly correlates with improved safety outcomesin maritime settings.

Moreover, the study identified a direct link between proficient communication skills and environmental protection practices. Cadets proficient in English exhibited a heightened awareness of environmental regulations and sustainabilityinitiatives, facilitating their active participation in eco-friendly practices during internships. This alignment between language proficiency and environmental stewardship is crucial for promoting sustainable maritime operations, as illustrated by their ability to engage in Table 1.

3.2 Comprehensive Analysis of Competencies

The qualitative data collected through interviews and observations provided a nuanced understanding of cadets' communication competencies in diverse operational scenarios. By analysing the scoring criteria detailed in Table 1, the study confirmed that cadets consistently performed at advanced levels in speaking, listening, and technical vocabulary proficiency. This proficiency enabled them to effectively communicate with international stakeholders, understand complex instructions, and uphold safety and environmental standards. The study's findings contribute to the academic discourse by highlighting the practical implications of language education in maritime training programs. The integrationof English for Specific Purposes (ESP) into vocational curricula emerges as a crucial factor in preparing cadets to navigateglobal maritime challenges competently. By focusing on enhancing communication skills, educational institutions and industry stakeholders can foster a new generation of maritime professionals equipped to promote safety, sustainability, and effective

communication in maritime operations.

This study provides compelling evidence of the positive impact of English language proficiency on maritime safety and environmental protection. Cadets' enhanced communication skills, particularly in speaking and listening, play a pivotal role in fostering safe operational practices and supporting environmental stewardship initiatives within the maritime sector. The comprehensive analysis presented in Table 1 underscores the critical need for continuous improvement in language education strategies to meet the evolving demands of global maritime operations. By criticallyexamining the results through the lens of academic rigour and practical applicability, this research contributes valuable insights that can inform educational practices, policy development, and industry standards. Moving forward, further research could explore longitudinal studies to assess the long-term effectiveness of language education initiatives in sustaining safe and environmentally responsible maritime practices. This ongoing commitment to enhancing communication competencies will be instrumental in shaping a sustainable future for the maritime industry.

4 Discussion

The discussion of this research focuses on interpreting and contextualising the findings regarding the impact of English language proficiency on maritime safety practices and environmental protection. Through a detailed analysis of communication skills development among senior cadets in vocational maritime education, this section examines the implications of the study's results for educational practices, industry standards, and future research directions.

4.1 Communication Skills Development and Professional Practices

The study's findings highlight a robust correlation between enhanced communication skills, particularly in English proficiency, and improved professional practices within the maritime sector. Senior cadets demonstrated a commendablelevel of fluency in spoken English, as evidenced by their ability to articulate complex technical information and engage effectively with international stakeholders. The high scores recorded in Table 1 for speaking proficiency underscore their capability to communicate safety protocols and operational instructions clearly, thus contributing to safer maritime operations. Moreover, the cadets' advanced listening comprehension skills facilitated their ability to follow detailed instructions and respond promptly to dynamic operational conditions. This aspect is crucial in maritime settings where swift and accurate communication is vital for mitigating risks and ensuring operational efficiency [15]. The observed competency in technical vocabulary further supported their proficiency in communicating precise information related to maritime operations, enhancing overall operational safety and performance.

4.2 Integration of Language Proficiency with Environmental Stewardship

Beyond safety protocols, the study revealed a significant alignment between language proficiency and environmentalstewardship among maritime cadets. Those proficient in English exhibited a heightened awareness of environmental regulations and sustainability practices, actively participating in eco-friendly initiatives during their internships. This finding underscores the role of language education in fostering a culture of environmental responsibility within the maritime industry [16,17]. By engaging in effective communication with international stakeholders and colleagues, cadetswere able to advocate for sustainable practices and contribute to environmental protection efforts. Their ability to communicate

complex environmental concepts and regulatory requirements in Table 1 reflects their preparedness to navigate and comply with global environmental standards, thereby enhancing the industry's sustainability practices.

4.3 Implications for Educational Practices and Industry Standards

The findings of this study have significant implications for educational institutions and industry stakeholders involved in maritime training and operations. Firstly, integrating English for Specific Purposes (ESP) into vocational curriculaemerges as a critical strategy for preparing cadets to meet the demands of global maritime operations effectively. The emphasis on practical communication skills, as highlighted in Table 1, equips cadets with the necessary competencies to navigate diverse cultural and professional contexts, thereby promoting safety, efficiency, and environmental stewardship. Educational institutions can leverage these findings to enhance their language education programmes, focusing on real-world applications and situational contexts that mirror actual maritime operations [18,19]. By incorporatingsimulated exercises and practical training modules, institutions can further develop cadets' communication skills andprepare them to handle complex challenges with confidence and competence. From an industry perspective, the study underscores the importance of recruiting and retaining maritime professionals with strong communication abilities. Companies are encouraged to invest in continuous professional development programmes that foster language proficiencyand cross-cultural communication skills among their workforce [20]. This investment not only enhances operationalefficiency but also strengthens the industry's capacity to uphold safety standards and environmental regulations on a global scale.

4.4 Future Research Directions

Looking ahead, future research could explore several avenues to build upon the findings of this study and deepen ourunderstanding of the relationship between language proficiency, safety practices, and environmental sustainability in maritime operations [7,8]. Longitudinal studies could track the career trajectories of cadets post-graduation to assess theenduring impact of language education on their professional performance and leadership roles within the industry. Additionally, comparative studies across different maritime training institutions and regions could provide insights into variations in language education practices and their respective impacts on safety and environmental outcomes [21]. Exploring innovative approaches to language education, such as digital learning tools and immersive language experiences, could also offer new perspectives on enhancing communication skills among maritime professionals in a rapidly evolving global landscape. Moreover, interdisciplinary research collaborations could further integrate language education with broader Environmental, Social, and Governance (ESG) frameworks, exploring how effective communication contributes to sustainable maritime practices and corporate social responsibility initiatives.

5 Conclusion

This research underscores the critical importance of English language proficiency in shaping safety practices and environmental stewardship within the maritime industry. The study's findings clearly demonstrate that enhanced communication skills, particularly in speaking, listening, and technical vocabulary, significantly contribute to operational safety and environmental protection among senior cadets. By equipping cadets with advanced

communication competencies, educational institutions play a pivotal role in preparing future maritime professionals to navigate complexoperational challenges effectively. Moreover, the integration of English for Specific Purposes (ESP) into vocational curricula emerges as a strategic approach to foster a culture of safety, efficiency, and environmental responsibility. Cadets proficient in English not only demonstrate a heightened ability to communicate effectively with international stakeholders but also exhibit a strong awareness of environmental regulations and sustainable practices. This dual capability positionsthem as agents of change within the industry, capable of advocating for and implementing eco-friendly initiatives. Looking forward, the findings suggest opportunities for continuous improvement in language education programmes andindustry standards to uphold safety protocols and environmental sustainability on a global scale. By prioritising the development of communication skills alongside technical proficiency, stakeholders can collectively contribute to a resilient and sustainable maritime future, ensuring the industry's readiness to meet evolving challenges and opportunitiesin a dynamic global landscape.

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