Content-Based Instruction as an Effective Strategy for Enhancing Maritime English Skills in Maritime Education

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Abstract

This study examines the effectiveness of Content-Based Instruction (CBI) in enhancing Maritime English proficiency among cadets at Sorong Merchant Marine Polytechnic. A quantitative approach was used, employing pre-test and post-test evaluations, along with a questionnaire to assess cadets' language development and perceptions. The study involved 24 fourth-semester cadets in the Nautical Studies program. Results showed a significant improvement in Maritime English proficiency, with average test scores increasing from 69.7 (pre-test) to 95.7 (post-test), demonstrating a substantial 26-point improvement. Statistical analysis (paired t-test, $p < 0.05$) confirmed the significance of this improvement. The questionnaire results indicated that cadets viewed the CBI approach as highly effective, with an average satisfaction score of 4.5 out of 5. This research highlights the success of CBI in bridging the gap between language acquisition and real-world maritime contexts, suggesting it could serve as a valuable model for Maritime English instruction in similar educational settings. The findings support the integration of CBI into maritime curricula to better prepare cadets for the linguistic and operational demands of the global maritime industry.

***Keywords**: Content-Based Instruction, Effective Strategy, Maritime English.*

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A. INTRODUCTION

Maritime English proficiency is an essential competency for future Deck and Engine officers, mandated by the International Maritime Organization (IMO) as part of the Standards of Training, Certification, and Watchkeeping for Seafarers (STCW). Effective communication in English is critical to ensuring operational efficiency and safety in international maritime operations, as English serves as the global lingua franca in the maritime sector (Nurdin et al., 2023; Simanjuntak, 2023). Given the diverse and multicultural nature of the maritime workforce, proficiency in Maritime English is not merely an academic requirement but a professional necessity, underpinning safety and efficiency at sea (Franceschi, 2014; Riyanto et al., 2023).

Research has consistently shown that language competence in Maritime English correlates strongly with real-world maritime experiences. Practical exposure to seafaring environments significantly enhances language acquisition, particularly in oral and auditory communication (Saray et al., 2021). However, traditional classroom-based approaches to language instruction often fall short in providing the interactive and context-driven learning experiences needed to develop these skills. Additionally, many cadets report challenges in acquiring the necessary proficiency in spoken

English, highlighting a gap between language education and the operational demands of the maritime industry (Rahman et al., 2022).

To address these challenges, Content-Based Instruction (CBI) has emerged as a promising pedagogical approach. CBI emphasizes the simultaneous teaching of language and subject-specific content, making it particularly suitable for Maritime English instruction. This approach integrates technical maritime knowledge with language learning, facilitating a more holistic educational experience that mirrors the demands of the maritime profession (Batu et al., 2021; Dirgeyasa, 2018). By focusing on content that is directly relevant to their future roles, cadets are able to engage with authentic materials and develop both linguistic and operational competencies in parallel (Puspitasari et al., 2020).

In Indonesia, the integration of CBI into Maritime English curricula aligns with international standards such as the IMO's Model Course 3.17, which underscores the importance of English proficiency for maritime operations. The application of CBI in various maritime education institutions has demonstrated its effectiveness in enhancing cadets' communicative abilities, particularly in specialized maritime terminology and operational contexts (Simbolon, 2020). Studies have highlighted that students who learn through CBI-based instruction show improved performance in both technical communication and general English skills, reflecting better preparedness for the global maritime workforce (Simanjuntak, 2024).

Furthermore, CBI's adaptability allows for the incorporation of modern educational technologies, including interactive learning platforms and digital resources, which have been shown to further enhance engagement and learning outcomes (Aprizawati et al., 2024; Gupron et al., 2023). The structured nature of CBI also supports the development of higher-order thinking skills, fostering a deeper understanding of maritime content while improving English proficiency.

However, despite its growing adoption, the implementation of CBI in Maritime English instruction still faces challenges, particularly in aligning teaching practices with the specific needs of cadets. Many existing Maritime English programs focus predominantly on language structure, often at the expense of practical language use in maritime contexts. A brief survey conducted by the researcher revealed that cadets expressed a strong preference for learning subject matter related to their field using English as the medium of instruction, recognizing it as essential for their sea practice placements and future careers.

Therefore, this study seeks to examine the application of the Content-Based Instruction approach in Maritime English teaching at Sorong Merchant Marine Polytechnic, with the goal of evaluating its impact on cadets' linguistic proficiency and readiness for professional maritime environments. By exploring the efficacy of CBI in this context, the study aims to contribute to the ongoing development of pedagogical strategies that better prepare cadets for the demands of the international maritime industry.

B. METHOD

The research employed a quantitative method with a quasi-experimental design without a control group to evaluate the effectiveness of the Content-Based Instruction (CBI) approach in enhancing cadets' mastery of Maritime English. The study population consisted of fourth-semester cadets from the Nautical Studies program at Sorong Merchant Marine Polytechnic, with a sample of 24 cadets selected through purposive sampling. The instruments used in this research were pre-tests and post-tests to measure English proficiency before and after instruction using the CBI method, as well as questionnaires to evaluate cadets' perceptions of the teaching method, learning motivation, and knowledge improvement.

The research procedure began with the preparation of instruments, administration of the pre-test, implementation of the CBI-based instruction over two months, followed by a post-test and the distribution of questionnaires to the cadets. Data were collected from the results of the pre-test and post-test, which were analyzed using the Sample Paired T-Test to determine whether there was a statistically significant improvement in Maritime English proficiency after the application of CBI. Additionally, questionnaire data were analyzed descriptively to assess the average and standard deviation of cadets' perceptions, motivation, and knowledge. The analysis indicated a significant improvement in technical English skills and high learning motivation following the implementation of the CBI method.

C. RESULTS AND DISCUSSION

The criteria for assessing learning outcomes were measured using two evaluation tools: pre-test, post-test, and a questionnaire. The research was conducted over a period of approximately two months. The results of the pre-test and post-test are shown in the following table:

Table 1 Pre-test and Post-test Results of Cadets

Respondent	Pre-Test	Post-Test
1	66.6	100
2	91.6	95.8
3	75	100
4	75	100
5	66.6	100
6	66.7	95.8
7	62.5	91.6
8	41.6	83.3
9	83.3	100
10	75	91.6
11	70.8	100
12	62.5	100
13	83.3	100
14	83.3	95.8

15	58.3	95.8
16	66.6	83.3
17	75	95.8
18	75	100
19	75	100
20	66.6	95.8
21	66.6	95.8
22	62.5	91.6
23	41.6	85
24	83.3	100
Average	**69.7**	**95.7**

From the table above, the average pre-test score of 69.7 indicates a basic understanding of maritime vocabulary, such as terminology related to ship parts or safety equipment, before receiving instruction through the CBI approach. In contrast, the average post-test score of 95.7 demonstrates a significant improvement in understanding more specific and technical vocabulary, including terms used in navigation, cargo management, and emergency operations. This clearly shows a considerable enhancement in learning outcomes.

During the pre-test, cadets were instructed to answer the test questions. After the pre-test, they attended several sessions on applying the CBI approach in Maritime English learning as part of the treatment. They then completed the post-test with the same number and type of questions as the pre-test. The results of the pre-test and post-test were analyzed using a sample paired t-test, as shown below:

Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	PRE TEST	69.7625	24	11.99793	2.44907
	POST TEST	95.7083	24	5.42097	1.10655

Paired Samples Correlations

		N	Correlation	Sig.
Pair 1	PRE TEST & POST TEST	24	.629	.001

Paired Samples Test

		Paired Differences			
		Mean	Std. Deviation	Std. Error Mean	95% Confidence ... Lower
Pair 1	PRE TEST - POST TEST	-25.94583	9.56806	1.95307	-29.98607

Paired Samples Test

		Paired ... 95% Confidence Interval of the ... Upper	t	df	Sig. (2-tailed)
Pair 1	PRE TEST - POST TEST	-21.90560	-13.285	23	.000

Figure 1. Pre-Test and Post-Test Calculation Results

The increase in the average post-test score shows a significant improvement compared to the pre-test, indicating that the implementation of CBI successfully enhanced the cadets' English proficiency. The average pre-test score was 69.7, which increased to 95.7 on the post-test, representing a significant improvement of 26 points. The statistical paired t-test was used to determine if this increase was statistically significant. The test results showed a p-value of less than 0.05, suggesting that the improvement was statistically significant and not merely due to chance.

This improvement is further supported by the results of the questionnaire on learning outcomes after applying the CBI approach. In general, perceptions of the CBI approach can be seen in questions 1-4 (Q1-Q4), while the learning experience is measured using questions 5-7 (Q5-Q7).

Table 2. Questionnaire Results

Respondent	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Average
1	4	5	4	4	5	5	5	4,6
2	5	3	3	5	5	4	5	4,3
3	5	4	3	5	5	5	5	4,6
4	5	3	4	5	5	5	4	4,4
5	4	3	3	5	5	5	5	4,3
6	5	3	3	4	5	5	5	4,3
7	5	3	3	5	5	5	5	4,4
8	5	3	5	5	5	5	5	4,7
9	4	5	4	4	5	5	5	4,6
10	5	3	5	5	5	5	5	4,7
11	3	4	5	5	5	5	5	4,6
12	5	5	3	5	5	5	5	4,7
13	3	5	5	3	5	4	5	4,3
14	3	5	5	4	5	5	4	4,4
15	3	3	5	3	5	5	5	4,1
16	3	5	5	4	5	5	5	4,6
17	3	5	5	5	5	5	5	4,7
18	3	5	4	4	5	5	5	4,4
19	5	5	5	3	5	5	5	4,7
20	3	5	5	4	5	5	5	4,6
21	3	5	5	5	5	5	5	4,7
22	5	5	3	4	5	5	4	4,4
23	5	4	3	5	5	5	5	4,6
24	5	5	3	4	5	5	4	4,4
Average								4,5

The overall average score obtained from the questionnaire is 4.5, which shows that the CBI learning approach was considered highly effective. According to the indicator, a score between 4.3 and 5.0 is classified as "Highly Effective." The cadets

strongly agreed that this method significantly improved their understanding of Maritime English and the content being taught, indicating the high success of this approach.

After implementing the CBI approach in Maritime English learning, cadets were directed to fill out the questionnaire for questions 1-7, which related to perceptions of Maritime English learning with the CBI approach and learning experiences.

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
QUEST 1	24	3.00	5.00	4.1250	.94696
QUEST 2	24	3.00	5.00	4.2083	.93153
QUEST 3	24	3.00	5.00	4.1250	.94696
QUEST 4	24	3.00	5.00	4.3750	.71094
QUEST 5	24	5.00	5.00	5.0000	.00000
QUEST 6	24	4.00	5.00	4.9167	.28233
QUEST 7	24	4.00	5.00	4.8750	.33783
Valid N (listwise)	24				

Figure 2 Questionnaire Calculation Results Using Likert Scale

As seen in the figure above, the data has a low standard deviation, indicating that most respondents provided answers that were close or identical to the average. This suggests a consensus or agreement among respondents regarding the statements provided. Nearly all respondents provided very similar answers, with most responses falling between "4" and "5."

A low standard deviation indicates that respondents generally agreed or disagreed with the statements provided, with minimal variation in opinion. A high standard deviation would indicate uncertainty or differing opinions, while a low value indicates strong consensus. In the context of Maritime English learning using the CBI approach, a low standard deviation on the questionnaire after the post-test shows that most cadets experienced uniform positive impacts from this approach.

The findings of this study provide strong evidence of the effectiveness of the Content-Based Instruction (CBI) approach in enhancing Maritime English proficiency among cadets. The results of both the pre-test and post-test show a significant improvement in the cadets' comprehension and use of Maritime English terminology, particularly in technical areas such as navigation, cargo handling, and emergency procedures. The average pre-test score of 69.7 reflects the cadets' initial moderate understanding of Maritime English before the CBI intervention, likely due to their exposure to basic vocabulary needed for ship operations but with limited familiarity with more complex technical terms. However, after the application of the CBI approach, the average post-test score increased significantly to 95.7, demonstrating a 26-point improvement. This result underscores the effectiveness of using real-world maritime content as a medium for English language instruction, a core principle of CBI. The statistically significant increase, as confirmed by the paired t-test ($p < 0.05$),

shows that this improvement is directly attributable to the CBI approach rather than chance.

The CBI approach likely contributed to this substantial improvement by providing a more engaging and context-relevant learning environment. Cadets were not only learning English in isolation but also acquiring it through content directly related to their professional maritime careers. The integration of language learning with maritime-specific content ensures that cadets are equipped to handle the communicative demands of their future professions. This method aligns with the growing need for standardized Maritime English training across the globe, as noted by previous studies (Gabrielli, 2015), and supports the development of specialized communication skills that are crucial for success in a multinational maritime environment.

While the CBI approach has proven effective, challenges remain in its implementation, including varying levels of instructor competence and the need for more engaging and creative teaching materials. Addressing these challenges will require a focus on motivational strategies and the development of a supportive learning environment to sustain cadets' interest in Maritime English (Sartika et al., 2019). Additionally, continuous evaluation and adaptation of teaching strategies will be necessary to meet the evolving needs of maritime education, ensuring that CBI remains relevant and effective in preparing cadets for their professional careers (Zhang et al., 2022).

The results of the questionnaire further highlight the positive perceptions of the CBI approach among cadets. The overall average score of 4.5, categorized as "Highly Effective," indicates that cadets were highly satisfied with the method. The consistency in their responses, as shown by the low standard deviation, reflects a shared positive experience, with most cadets agreeing that the integration of Maritime English with practical maritime content significantly enhanced their ability to comprehend and use specialized terminology. This high level of consensus suggests that the CBI approach could serve as a valuable model for Maritime English instruction in similar educational settings.

The alignment of these findings with existing literature on CBI further supports the effectiveness of this approach in professional and technical education contexts. Studies have consistently shown that learners are more likely to retain and apply new language skills when they are embedded within subject matter relevant to their careers (Amiri & Fatemi, 2014). By incorporating real-life incidents from the maritime industry, students are exposed to practical scenarios that require them to apply theoretical knowledge, effectively bridging the gap between academic learning and real-world application (Lekakou et al., 2023).

The significant gains in cadet performance following the CBI intervention highlight the potential for wider adoption of this approach in Maritime English instruction. Traditional methods that focus solely on language mechanics may be insufficient for students preparing for careers that require both technical knowledge and communication skills. By integrating language instruction with real-world

maritime content, the CBI approach offers a more effective and relevant way to prepare cadets for the linguistic and technical challenges they will encounter onboard ships. The strong consensus among cadets regarding the effectiveness of this approach further suggests that Maritime training institutions should consider adopting or expanding CBI in their curricula to better meet the linguistic demands of the maritime industry.

D. CONCLUSION

The findings of this research clearly indicate that the Content-Based Instruction (CBI) approach is highly effective in improving Maritime English proficiency among cadets, as demonstrated by the significant increase in test scores from an average of 69.7 in the pre-test to 95.7 in the post-test. By incorporating authentic maritime content, CBI not only enhances cadets' vocabulary acquisition but also strengthens their ability to use industry-specific terminology in practical contexts such as navigation, cargo handling, and emergency procedures. The positive feedback from cadets further confirms the success of CBI in making the learning process more engaging and directly relevant to their career paths. These results align with existing literature, which highlights that contextualized language instruction improves retention and application. In the field of Maritime English, CBI bridges the gap between theoretical knowledge and real-world application, preparing cadets for communication challenges in the maritime industry. While challenges like instructor training and the need for innovative teaching materials exist, the overall success of CBI suggests that it should be widely adopted in Maritime English programs. As the maritime industry continues to globalize, integrating CBI into language training curricula is essential to equip future seafarers with the linguistic and technical skills necessary for their careers.

REFERENCES

1. Amiri, M., & Fatemi, A. H. (2014). The Impact of Content-Based Instruction on Students' Achievement in ESP Courses and Their Language Learning Orientation. *Theory and Practice in Language Studies*, *4*(10). https://doi.org/10.4304/tpls.4.10.2157-2167
2. Aprizawati, A., Satria, B., & Johnson, C. (2024). *The effect of Android-Based Maritime English Application at Nautical Study Program of SMKN 1 Bukit Batu*. https://doi.org/10.4108/eai.21-9-2023.2343002
3. Batu, P. N. L., Priadi, A. A., & Cahyaningrum, W. (2021). Accessible Learning Sources: A Need Analysis on Maritime English Learning Apps. *Transactions on Maritime Science*, *10*(2), 520–525. https://doi.org/10.7225/toms.v10.n02.020
4. Dirgeyasa, I. W. (2018). The Need Analysis of Maritime English Learning Materials for Nautical Students of Maritime Academy in Indonesia Based on STCW'2010 Curriculum. *English Language Teaching*, *11*(9), 41.
5. Franceschi, D. (2014). The Features of Maritime English Discourse. *International Journal of English Linguistics*, *4*(2), 78–87. https://doi.org/10.5539/ijel.v4n2p78

6. Gabrielli, A. (2015). Standardising Maritime English Training and Assessment Through International Coordination of Content-Based Instruction. *Scripta Manent*, *10*(2), 52–62.
7. Gupron, A. K., Santoso, A. D., & Harianto, B. B. (2023). Effectiveness of English Medium Instruction Implementation on Boarding Maritime Education. *Technium Social Sciences Journal*, *51*, 80–91. https://doi.org/10.47577/tssj.v51i1.10135
8. Lekakou, M., Iakovaki, H., Vintzilaios, D., Gota, M., Georgoulis, G., & Vintzilaiou, T. (2023). Introducing the Use of Case Studies Methodology in Training for Soft Skills in Maritime Universities. The Isol-Met Program. *Pedagogika-Pedagogy*, *95*(6s), 111–122.
9. Nurdin, M., Rosiana, E., & Rahman, M. A. (2023). Investigating Maritime Cadets' Difficulties In English Speaking At Nusantara Maritime Academy Banjarmasin Moch. *Pena Jangkar*, *2*(2), 1–11.
10. Puspitasari, L., Batu, P. N. F. L., Kusumaningrum, S., & Wulandari, R. (2020, January). Maritime English Teachers in Indonesia. In *Proceedings of the 1st International Conference on Management, Business, Applied Science, Engineering and Sustainability Development, ICMASES 2019, 9-10 February 2019, Malang, Indonesia*.
11. Rahman, M. A., Rosiana, E., & Nurdin, M. (2022). Needs Analysis Of English Course For Cadets At Nusantara Maritime Academy Banjarmasin. *Pena Jangkar*, *2*(1), 28–44.
12. Riyanto, B., Nurmala, E., Agustina, I., & Maidari, S. R. (2023). Indonesian Seafarers' Intercultural Communication Challenges With Multinational Crews. *Journal of Intercultural Communication*, *23*(1), 76–81. https://doi.org/10.36923/jicc.v23i1.92
13. Saray, S., Satır, T., & Doğan-Sağlamtimur, N. (2021). Proficiency of Maritime English course: An investigation in Istanbul, Turkey. *Heritage and Sustainable Development*, *3*(1), 6–15. https://doi.org/10.37868/hsd.v3i1.48
14. Sartika, Jabu, B., & Salija, K. (2019). *Demotivational Factors and Strategies to Motivate the Students in Learning Maritime English at Balai Pendidikan Dan Pelatihan Ilmu Pelayaran (BP2IP) Barombong* [Doctoral Dissertation, Universitas Negeri Makassar].
15. Simanjuntak, M. B. (2023). Elevating Maritime Competence: A Qualitative Analysis of Semester 3 Cadets' Perspectives at Maritime Institute Jakarta (STIP Jakarta). *Morfologi: Jurnal Ilmu Pendidikan, Bahasa, Sastra dan Budaya*, *1*(6), 192-203.
16. Simanjuntak, M. B. (2024). Exploring the Intersection of Psychological Features and Language Proficiency in Seamen's Activity: A Qualitative Analysis of Maritime Cadets at Maritime Institute Jakarta (STIP Jakarta). *Pragmatik : Jurnal Rumpun Ilmu Bahasa Dan Pendidikan*, *2*(1), 216–227. https://doi.org/10.61132/pragmatik.v2i1.254
17. Simbolon, N. E. (2020). CLIL practice in a maritime English course: EFL students' perception. *EduLite: Journal of English Education, Literature and Culture*, *5*(2), 263. https://doi.org/10.30659/e.5.2.263-276
18. Zhang, L., Li, Q., & Liu, W. (2022). A Study on the Effectiveness of College English Teaching Based on Content-Based Instruction Teaching Philosophy. *Frontiers in Psychology*, *13*(July). https://doi.org/10.3389/fpsyg.2022.921654