



# Enhancing students' speaking skills using ChatGPT application in ESP maritime English learning

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This research investigated the impact of utilizing ChatGPT, an advanced artificial intelligence language model, on improving maritime English-speaking skills among students at a maritime polytechnic in Indonesia. Effective communication in maritime operations is critical for maintaining safety, preventing misunderstandings, and ensuring efficient coordination among multinational crew members. However, many maritime students face challenges in attaining adequate English-speaking proficiency necessary for these operations. This study adopted a classroom action research (CAR) design involving 69 students over two instructional cycles. Data collection methods included pretests and post-tests to quantitatively measured speaking performance, alongside questionnaires to gather qualitative insights into students' perceptions of the learning process and their engagement. Quantitative data were analyzed using paired sample t-tests in SPSS 22, revealing statistically significant improvements in key areas such as vocabulary use, grammatical accuracy, and overall fluency after the introduction of ChatGPT-assisted learning activities. Additionally, qualitative findings from questionnaires indicated enhanced student confidence, motivation, and active participation in speaking tasks, suggesting positive attitudes toward this AI-supported learning approach. The study highlighted the potential of integrating ChatGPT as a supplementary instructional tool within maritime English curricula to support language acquisition more effectively. By fostering maritime English-speaking competence through innovative technology integration, this approach contributed to better preparation of students for real-world communication demands in the maritime industry. Ultimately, the findings demonstrated that ChatGPT can serve as a valuable resource for language instructors, promoting more engaging, interactive, and productive learning environments that align with the operational needs of global maritime professionals.

**Keywords:** ChatGPT, ESP, maritime English, speaking

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## INTRODUCTION

The maritime industry relies fundamentally on effective communication to ensure safety, operational efficiency, and adherence to international regulations. Given the multicultural and multilingual composition of ship crews, English serves as the lingua franca facilitating coordination among officers, crew members, port authorities, and other maritime stakeholders (Čulić-Viskota & Kalebota, 2013). In response to the necessity for standardized communication, the International Maritime Organization (IMO) developed the Standard Marine Communication Phrases (SMCP) to promote clarity and prevent misunderstandings in both routine operations and emergency situations (Limbong et al., 2024).

Proficiency in Maritime English, particularly oral communication, is critical for mitigating risks associated with miscommunication, which can result in navigational errors, operational inefficiencies, and maritime accidents (Yin et al., 2025). Nonetheless, many maritime students experience significant difficulties in attaining fluency and confidence. These challenges stem from limited exposure to authentic communicative contexts, pronunciation difficulties, complex technical vocabulary, and a lack of opportunities for real-time interactive practice (Celo et al., 2016). Conventional pedagogical methods—such as lectures, scripted dialogues, and role-plays—tend to prioritize linguistic accuracy over spontaneous communication, thereby inadequately developing learners' interactive competence (Halali et al., 2022).

Recent advancements in artificial intelligence (AI) have introduced innovative avenues for language learning enhancement. AI-driven conversational agents, such as OpenAI's ChatGPT, provide interactive and contextually adaptive environments in which learners can practice speaking, obtain immediate corrective feedback, and engage with domain-specific scenarios (Aljanabi, 2023). Empirical research within English for Specific Purposes (ESP) and English as a Foreign Language (EFL) context suggests that AI chatbots contribute positively to improvements in speaking fluency, vocabulary acquisition, and learner motivation, while also reducing communication anxiety (Pikhart, 2020).

Despite these promising outcomes, limited research has examined the use of ChatGPT specifically within Maritime English education. There remains a notable gap regarding the impact of AI-assisted interaction on students' speaking fluency, grammatical accuracy, and affective factors such as confidence and engagement, all of which are essential for communicative competence in maritime operations. This gap highlights the need for empirical studies focusing on AI-mediated oral practice in ESP contexts characterized by specialized terminology and realistic situational demands.

Therefore, changes in the field of education are a response to students where technology is aligned to create new opportunities creatively and innovatively. Technology can facilitate student interaction in the learning process and create an interactive and communicative classroom environment (Rojabi & Femilia, 2023). Learning at different times and places is characteristic of education in the Revolutionary Era (Marzuki et al., 2022). With the advancement of artificial intelligence (AI), ChatGPT presents a promising solution to enhance students' speaking skills in English learning (Ariati, 2024). ChatGPT, an AI-powered conversational tool, can simulate interactive dialogues, provide instant feedback, and create real-world maritime communication scenarios. By engaging in AI-driven conversations, students can improve their pronunciation, fluency, and confidence in using Maritime English in professional settings (Ratnaningsih et al., 2025).

So, this study aimed to investigate the integration of ChatGPT into Maritime English instruction to enhance students' speaking proficiency. Specifically, it examined the extent to which ChatGPT-assisted learning improves students' speaking fluency, grammatical accuracy, and

vocabulary use in Maritime English communication. In addition, the study explored students' perceptions of ChatGPT's role in fostering confidence, engagement, and motivation during speaking activities. Through these inquiries, the research sought to contribute to the growing body of literature on AI-assisted language learning and provide pedagogical insights for integrating emerging technologies into Maritime English education.

METHODS

This study employed Classroom Action Research (CAR) as its research design. CAR is a reflective and cyclical research approach aimed at improving teaching and learning practices through systematic planning, implementation, observation, and reflection in authentic classroom contexts (Manfra, 2019). In this study, CAR was used to investigate how the integration of ChatGPT into Maritime English instruction could enhance students' speaking proficiency. The research was conducted over four cycles, each consisting of the stages of planning, action, observation, and reflection.

The research was conducted during the 2024/2025 academic year at the Ship Operation Engineering Technology (Teknologi Rekayasa Operasional Kapal) study program of a maritime polytechnic in Indonesia. A total of 69 fourth-semester students (52 male and 17 female students, aged 19–21 years) participated in the study. All participants were enrolled in the Maritime English course and had previously completed introductory English for Specific Purposes (ESP) modules. The instruction spanned six 90-minute sessions, focusing on three thematic topics relevant to maritime communications such as safety equipment drills, the function of navigation equipment, and meteorological condition. Each topic was taught across two sessions.

The study followed four CAR cycles, as summarized in Table 1, to ensure iterative improvement and systematic observation.

TABLE 1 | Summary of the Classroom Action Research Cycles

| Cycle              | Focus and Activities                                                                                                                                                                                                             | Data Collected                      |
|--------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|
| Cycle 1 - Planning | Identified students' speaking difficulties through a pretest and diagnostic questionnaire; designed the intervention by integrating ChatGPT conversation practice; prepared maritime-specific topics and rubrics for assessment. | Pretest scores, questionnaire data  |
| Cycle 2 - Action   | Implemented ChatGPT-assisted speaking practice. Students used ChatGPT to simulate real-life maritime dialogues based on assigned topics. The instructor facilitated discussions and provided feedback.                           | Observation notes, audio recordings |

|                                     |                                                                                                                                                                                                                                                 |                                              |
|-------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------|
| Cycle 3 - Observation               | Observed student performance and interaction patterns using an observation checklist. Collected student feedback and lecturer evaluations using validated rubrics for fluency, accuracy, vocabulary, and pronunciation (Fadila & Trisno, 2025). | Observation data, rubric scores, field notes |
| Cycle 4 – Reflection and Evaluation | Analyzed and reflected on the results of the intervention. Conducted a post-test and follow-up questionnaire to evaluate improvement and perceptions. Discussed findings with the course lecturer.                                              | Post-test scores, reflection data            |

The study employed several instruments to collect quantitative and qualitative data. A pretest and post-test were administered to measure students' speaking performance before and after the ChatGPT-assisted intervention. In each test, students performed a short maritime communication task evaluated using a validated speaking rubric comprising four criteria—fluency, grammatical accuracy, vocabulary, and pronunciation—rated on a 1–5 scale (adapted from [Fadila & Trisno, 2025](#)). The rubric demonstrated high reliability, with a Cronbach's alpha value of 0.87, and inter-rater reliability was confirmed through Cohen's kappa ( $\kappa = 0.82$ ) after two independent raters assessed each performance. Additionally, two sets of questionnaires (administered pre- and post-intervention) were used to gather information on students' perceptions, speaking difficulties, and attitudes toward ChatGPT use. The questionnaire items were rated on a 5-point Likert scale, and their content validity was ensured through expert review by three Maritime English lecturers. Finally, an observation sheet was utilized to record classroom interactions, engagement levels, and language use during ChatGPT-based activities, with observations conducted by the researcher and validated through peer debriefing with the course lecturer.

Data collection was conducted over six consecutive sessions spanning three weeks. In the first week, a pretest and diagnostic questionnaire were administered to identify students' initial speaking proficiency and perceptions. During the second and third weeks, ChatGPT-assisted learning activities were implemented as the core intervention. At the end of Week 3, a post-test, final questionnaire, and reflection session were carried out to evaluate learning outcomes and gather feedback on the use of ChatGPT in Maritime English instruction. All classroom sessions were audio-recorded to ensure data accuracy, and field notes were maintained throughout the process to support the qualitative analysis.

Quantitative data from the pretests and post-tests were analyzed using SPSS version 22. A paired samples t-test was conducted to determine whether there was a statistically significant difference in students' speaking performance

before and after the ChatGPT-assisted intervention. Descriptive statistics, including mean, standard deviation, and percentage, were used to analyze the questionnaire responses. Meanwhile, qualitative data obtained from classroom observations and open-ended questionnaire items were analyzed thematically to identify recurring patterns related to student engagement, confidence, and perceived learning improvement.

To ensure the credibility and trustworthiness of the findings, several validation strategies were applied. Triangulation was used by combining quantitative data (test scores) and qualitative data (observations and questionnaires). Peer debriefing was conducted regularly, allowing the researcher to discuss observations and interpretations with a peer lecturer to ensure consistency. Member checking was also implemented, in which selected students reviewed summaries of observation notes to confirm their accuracy. Furthermore, all research instruments were validated through expert review to ensure they measured the intended constructs effectively.

Ethical approval for this study was granted by the institution's Research Ethics Committee. Prior to participation, all students were informed about the study's objectives and procedures, and informed consent was obtained. Participants were assured of anonymity and confidentiality, and their participation was entirely voluntary, with the option to withdraw at any time without any academic penalty.

## RESULTS AND DISCUSSION

### Cycle 1 – Problem Identification

A pre-test was conducted to identify students' challenges in speaking Maritime English before implementing any instructional interventions. This initial assessment aimed to evaluate their baseline performance across four key aspects of speaking skills—grammar, vocabulary, fluency, and comprehension—within the context of maritime-related topics such as Safety Equipment, Navigation Equipment, and Meteorological Conditions. The results of the pre-test provided valuable insights into the areas where students struggled most, serving as a foundation for designing targeted learning strategies to enhance their communicative competence in Maritime English.

The test was about the students' performance in explaining and performing dialogs with their peers about the maritime-related topics, they were safety equipment, navigation equipment, and meteorological condition. The aspects in the speaking test were the grammar, vocabulary, fluency and comprehension. The sample of dialogs were transcribed and analyzed as the qualitative data. Below was one of the samples of dialog transcriptions which talked about the safety equipment on board.

#### Transcription data 1

Student 6: *Eh... good morning, my friend. Today we talk about safety, yes?*

Student 7: *Yes, about safety equipment on the sheep... eh, ship.*

Student 6: (*smiles*) *Yes, ship. Okay. The... uh... lifeboat is use for... for escape when the ship is sinking.*

Student 7: *Yes, and... the lifejacket, we must wear it when... when emergency coming.*

Student 6: *Coming... or happen?*

Student 7: *Ah, yes, when emergency happen.*

Student 6: *Okay. And fire extinguisher... it use to stop fire.*

Student 7: *Yes, but sometimes we no know how to use correctly.*

Student 6: *True. The officer must train us how to operate it.*

Student 7: *Yes, sometimes I forget the name of equipment, because many... many name.*

Based on the observation in transcription data 1, the students demonstrated several speaking difficulties commonly found among English language learners in a maritime context. Grammatical errors were evident in utterances such as “*It use for escape*” instead of “*It is used for*

*escaping*,” showing limited mastery of verb forms and passive constructions. Pronunciation problems appeared in the confusion between similar sounds, as in “*sheep*” for “*ship*,” which affected intelligibility. Vocabulary limitations were also noticeable when students hesitated or used inaccurate expressions like “*when emergency coming*.” In terms of fluency, frequent pauses and fillers (e.g., “uh,” “for... for escape”) indicated lack of confidence and insufficient automaticity in speech production. Despite these weaknesses, students showed awareness of self-correction, as seen when one learner replaced “*coming*” with “*happen*.” Overall, the observation revealed that students’ speaking difficulties mainly stemmed from limited grammatical accuracy, restricted vocabulary range, pronunciation interference, and low fluency, which hindered effective oral communication during the activity.

Then, based on the dialogs that performed by the students, the pretest scores were taken. Then, the pretest result was shown in [table 2](#).

TABLE 2 | Pretest Result

| Topic                     | Grammar | Vocabulary | Fluency | Comprehension | Overall Avg |
|---------------------------|---------|------------|---------|---------------|-------------|
| Safety Equipment          | 70.2    | 75.6       | 73.8    | 77.4          | 74.3        |
| Navigation Equipment      | 73.5    | 78.9       | 75.2    | 80.1          | 76.9        |
| Meteorological Conditions | 69.8    | 74.4       | 72.1    | 76.3          | 73.2        |

The results presented in [table 2](#) showed the results of the speaking performance assessment across three Maritime English topics—Safety Equipment, Navigation Equipment, and Meteorological Conditions—showed varying levels of improvement in different aspects of language use. For the topic of Safety Equipment, students achieved average scores of 70.2 in grammar, 75.6 in vocabulary, 73.8 in fluency, and 77.4 in comprehension, with an overall mean score of 74.3. In Navigation Equipment, performance slightly improved across all areas, with scores of 73.5 in grammar, 78.9 in vocabulary, 75.2 in fluency, and 80.1 in comprehension, resulting in the highest overall average of 76.9. Meanwhile, for Meteorological Conditions, students obtained scores of 69.8 in grammar, 74.4 in vocabulary, 72.1 in fluency, and 76.3 in comprehension, with an overall average of 73.2. These results suggested that students demonstrated stronger performance in comprehension and vocabulary, particularly in topics involving navigation-related communication.

Then, a questionnaire was administered to identify students’ challenges in speaking Maritime English. There were five items in the questionnaire that investigated the students’ speaking difficulties. The first was to determine the limited vocabulary that the students had, with the statement, “*I often struggled to use specific maritime vocabulary when speaking English*.” The second concerned the students’ self-confidence when speaking English, expressed in the statement, “*I felt nervous or lacked confidence when I had to speak English in front of others*.” The third addressed grammatical construction difficulties through the statement, “*I found it difficult to create grammatically correct sentences when speaking English*.” The fourth referred to the inability to understand maritime communication contexts, as reflected in the statement, “*I had trouble understanding the context or meaning of maritime communication expressions*.” The last

item focused on the fear of making mistakes, represented by the statement, “*I was afraid of making mistakes when speaking English, which made me hesitate to speak*.” Each of these questionnaire items was designed using a 5-point Likert scale (1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, 5 = Strongly Agree).

TABLE 3 | Questionnaire Result Cycle 1

| Number | Speaking Difficulty                                       | Average Rating (out of 5) |
|--------|-----------------------------------------------------------|---------------------------|
| 1      | Limited maritime vocabulary                               | 4.8                       |
| 2      | Lack of confidence in speaking English                    | 4.1                       |
| 3      | Difficulty in constructing grammatically correct sentence | 4                         |
| 4      | Inability to understand maritime communication contexts   | 3                         |
| 5      | Fear of making mistakes during conversations              | 4                         |

Based on the data presented in [Table 3](#): Questionnaire Result Cycle 1, The results presented in Table 3 showed the students perceived speaking difficulties during Cycle 1 of the study. The highest-rated difficulty was limited maritime vocabulary, with an average rating of 4.8 out of 5, indicating that most students struggled significantly with recalling and using technical maritime terms in communication. The next major challenges were a lack of confidence in speaking English (4.1) and difficulty in constructing grammatically correct sentences (4.0), suggesting that linguistic competence



and self-assurance were closely linked issues affecting their speaking performance. The fear of making mistakes during conversations also received a relatively high rating (4.0), reflecting students' anxiety and hesitation in oral communication. In contrast, inability to understand maritime communication contexts had the lowest rating (3.0), implying that while students generally understood the situational aspects of maritime exchanges, their main barriers lay in vocabulary, grammar, and confidence. Overall, the data indicate that students' speaking difficulties were primarily linguistic and psychological rather than contextual.

In conclusion, the findings from both the pretest and questionnaire highlighted that the students' primary speaking difficulties before the intervention were linguistic and affective rather than contextual. These baseline results justified the need for targeted instruction that aimed to enhance maritime vocabulary, grammatical accuracy, and communicative confidence through technology-assisted learning.

Cycle 2 – Implementation of ChatGPT – Assisted Activities

In this phase, students had the ChatGPT integration in the speaking practices. They simulated the dialogs based on three maritime English topics. They are the safety equipment, navigation equipment and meteorological conditions. The questionnaires items were ChatGPT was helpful in supporting my speaking practice in maritime English, Using ChatGPT helped me learn and use more specific maritime vocabulary, I felt more confident speaking English after practicing with ChatGPT, ChatGPT helped me construct more grammatically correct and natural-sounding sentences, and the speaking scenarios provided by ChatGPT were relevant to maritime communication situations. Each of those items designed for a 5-point Likert scale (1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, 5 = Strongly Agree).

TABLE 4 | Questionnaire Result Cycle 2

| Number | Aspect                          | Average Rating (out of 5) |
|--------|---------------------------------|---------------------------|
| 1      | Helpfulness of ChatGPT          | 4.6                       |
| 2      | Vocabulary improvement          | 4.4                       |
| 3      | Confidence in speaking          | 4.2                       |
| 4      | Grammar assistance              | 4.3                       |
| 5      | Relevance of maritime scenarios | 4.5                       |

The data in [table 4](#) showed the students' experience using ChatGPT in maritime English learning was evaluated using a 5-point Likert scale, and the results showed a generally high level of satisfaction across all aspects. The results of the post-intervention questionnaire indicate that students responded positively to the integration of ChatGPT in Maritime English learning. As shown in the data, the helpfulness of ChatGPT received the highest average rating of 4.6, suggesting that students perceived the tool as highly effective in supporting their learning process. The relevance of maritime scenarios also scored high at 4.5, reflecting that the AI-generated dialogues and contexts were appropriate and aligned with

real-life maritime communication situations.

In terms of language development, students reported notable improvement in vocabulary (4.4) and grammar assistance (4.3), showing that ChatGPT effectively supported their linguistic competence by providing meaningful exposure to technical terms and grammatical structures. Additionally, the confidence in speaking aspect received a rating of 4.2, indicating that interaction with ChatGPT helped reduce students' hesitation and anxiety during oral communication, although some learners may still require further practice to build stronger self-assurance. The transcription data 2 below was from the observation activities in cycle 2.

Transcription data 2

- Student 6: *Today we are talking about safety equipment on board. I think the lifejacket is the most important one because it help—eh, helps us float in the water.*
- Student 7: *Yes, and also we must know how to wear it correctly. Some cadets still not know—uh, don't know how to adjust the straps.*
- Student 6: *Right. And the lifebuoy is used when someone fall overboard. We can throw it quickly to the sea.*
- Student 7: *Yes, it has line for pulling the person back to the ship. Before, I didn't know the word line for rope, but ChatGPT teach me that.*
- Student 6: *Me too. I also learn the word buoyancy and fire extinguisher. The extinguisher is used for stop—uh, stopping the fire in emergency.*
- Student 7: *Yes, and now I feel more confident to speak because before I always afraid to make mistake.*

The observation notes indicated clear evidence of students' language development in several key areas of speaking performance. First, there was notable improvement in vocabulary use, as students began to employ more accurate and topic-specific maritime terms such as *buoyancy*, *lifebuoy*, and *fire extinguisher*.

This suggests that consistent exposure to technical language during guided practice enhanced their lexical repertoire and helped them communicate more precisely about shipboard safety. Second, grammar improvement was evident through self-correction behaviors, for instance when students adjusted phrases like “*it help*” to “*it helps*” and “*stop*” to “*stopping*.” These self-repairs show growing grammatical awareness and internalization of feedback provided during instruction.

Furthermore, the observation reflected increased confidence and fluency in oral communication. Students participated actively, expressed ideas more spontaneously, and demonstrated reduced hesitation, indicating progress in overcoming speaking anxiety. Although minor issues such as verb tense inconsistency and omission of articles persisted, these did not significantly hinder comprehension. Overall, the analysis confirmed that the students made steady progress in vocabulary acquisition, grammatical accuracy, and speaking confidence, reflecting the effectiveness of communicative practice and interaction-based learning in improving their Maritime English proficiency.

In general, these findings in this cycle demonstrated that ChatGPT contributed positively to both the linguistic and affective aspects of Maritime English learning. The tool was perceived as a practical and engaging aid that enhanced vocabulary mastery, grammatical accuracy, and speaking confidence through authentic, scenario-based communication tasks.

### Cycle 3 – Improvement in Performance and Learner Engagement

In Cycle 3, the focus shifted toward evaluating the impact of ChatGPT-integrated speaking practices through performance observation and feedback. During this phase, the lecturer conducted systematic observations by video-recording the students' speaking performances in a controlled classroom setting.

Students were assigned to work individually and in pairs to simulate maritime-specific dialogues using ChatGPT as a practice partner prior to the recorded assessment. The ChatGPT provided them with interactive prompts, vocabulary suggestions, and corrective feedback, helping them prepare for real-time verbal communication in a maritime context.

The speaking tasks in this cycle were organized around three essential Maritime English topics that are fundamental for effective communication at sea. The first topic, Safety Equipment, required students to describe and explain the function, use, and location of life-saving appliances such as lifejackets, fire extinguishers, and lifeboats. The second topic, navigation equipment, focused on technical dialogues involving the use of radar, GPS (Global Positioning System), AIS (Automatic Identification System), ECDIS (Electronic Chart Display and Information System), and the compass on the bridge. Last, the third topic, meteorological conditions, engaged students in reporting and interpreting weather updates by using appropriate maritime terminology related to wind direction, sea state, fog, storms, and visibility. Together, these topics aimed to enhance students' mastery of technical vocabulary and situational communication skills relevant to shipboard operations.

During the assessment, students were asked to present short dialogues reflecting realistic on-board scenarios. Their performances were recorded to allow for detailed analysis across four criteria: grammar, vocabulary, fluency, and comprehension. The lecturer then analyzed the recordings, using a standardized rubric to assess progress. Additionally, peer and lecturer feedback sessions were conducted after the recordings. Students were shown clips of their performances and asked to reflect on their speaking—what went well, where they hesitated, and how they could improve. The observation sample activities were shown in transcription data 3 for the students' dialogs and transcription data 4 for lecturer feedback and discussion session.

#### Transcription data 3

Student 6: *Good morning. Have you checked the safety equipment in the engine room today?*

Student 7: *Yes, I already check—uh, checked—the fire extinguishers and the emergency exit light. Everything is in good condition.*

Student 6: *Good. Don't forget to inspect the lifejackets in the locker. Some of them maybe—uh, may be—need to replace because the straps are broken.*

Student 7: *Oh yes, I saw one lifejacket with torn belt. I will report it to the duty officer after this.*

Student 6: *Also, the lifebuoy on the aft deck must be checked every week. Last week it was missing the line.*

Student 7: *Yes, sir. I will make sure it's complete now. The lifebuoy is important when man overboard happen—uh, happens.*

Student 6: *Correct. We must always be ready for any emergency.*

#### Transcription data 4

Lecturer: *Very good, cadets. You both demonstrated clear understanding of the topic. I can see improvement in your vocabulary, especially with technical words like lifebuoy, lifejacket, and emergency exit light.*

Student 7: *Thank you, mam. I try to remember the correct terms from our last practice with ChatGPT.*

Lecturer: *That's great! However, be careful with verb forms. For example, you said "I already check" — it should be "I have already checked."*

Student 6: *Yes, mam. I will remember that next time.*

Lecturer: *Also, good effort on fluency. There were only small pauses when you tried to find the right word, which is normal. How did you feel during the recording?*

Student 7: *At first, I feel nervous, but after speaking a few minutes, I become more confident.*

Lecturer: *Excellent. That's progress. You are speaking more naturally now, and your comprehension is improving too — you understood each other without repeating instructions. Keep practicing to strengthen grammar and fluency.*

The dialogue and feedback session in transcription data 3 and 4 above revealed clear evidence of students' language development and communicative progress in the topic of Safety Equipment on Board. Both students demonstrated an improved command of maritime-specific vocabulary, as they used technical terms such as lifebuoy, lifejacket, fire extinguisher, and emergency exit light. This indicated that the learners had become more familiar with shipboard terminology through repeated exposure and practice. Their comprehension was also strong, as shown by the smooth exchange of information and their ability to respond appropriately without needing clarification or repetition.

In terms of grammar, minor errors were observed in verb forms and modal constructions, for instance, "I already check" instead of "I have already checked" and "when man overboard happen" instead of "happens." However, the students' self-corrections during speech (e.g., "check—uh, checked") demonstrated growing grammatical awareness and the ability to monitor their own language use in real time. This self-correcting behavior reflected meaningful improvement in their linguistic competence.

Regarding fluency, both students maintained a natural conversational flow with minimal hesitation, showing better confidence and rhythm compared to earlier practice sessions. Although there were slight pauses when they searched for the

correct word, these did not disrupt communication. The students also showed increased confidence, as noted when Ahmad mentioned that he felt “*more confident*” after the recording. The lecturer’s feedback confirmed these observations, emphasizing progress in vocabulary accuracy,

fluency, and comprehension while acknowledging that grammar still required consistent practice. Then, the result summary of the speaking tasks with feedback and discussion was shown in [table 5](#).

TABLE 5 | Summary of Speaking Tasks Average Scores

| Topic                     | Grammar | Vocabulary | Fluency | Comprehension | Overall Avg |
|---------------------------|---------|------------|---------|---------------|-------------|
| Safety Equipment          | 79.4    | 84.2       | 82.1    | 86.5          | 83.0        |
| Navigation Equipment      | 82.7    | 88.5       | 85.3    | 90.2          | 86.7        |
| Meteorological Conditions | 78.6    | 83.1       | 80.8    | 85.0          | 81.9        |

The results presented in [table 5](#) showed a clear improvement in students’ speaking performance across all Maritime English topics after the ChatGPT-assisted learning intervention. Among the assessed aspects—grammar, vocabulary, fluency, and comprehension—all showed notable gains compared to the pretest results, indicating the positive impact of AI-supported instruction on students’ speaking proficiency.

The Navigation Equipment topic achieved the highest overall average score of 86.7, with particularly strong results in comprehension (90.2) and vocabulary (88.5). This suggests that students became more confident and accurate when communicating in familiar, technical maritime contexts. Similarly, performance in Safety Equipment was strong, with an overall mean of 83.0, reflecting consistent improvement in all areas, especially in comprehension (86.5) and vocabulary (84.2).

Meanwhile, the Meteorological Conditions topic, though slightly lower with an overall average of 81.9, still demonstrated substantial progress, indicating better understanding and use of meteorological terms and expressions.

Overall, the data indicate that students made the most progress in comprehension and vocabulary, suggesting that ChatGPT effectively enhanced their understanding of maritime contexts and exposure to specialized terminology. Improvements in grammar and fluency further reveal growing linguistic competence and confidence in oral communication. These findings confirm that ChatGPT-assisted activities significantly supported students’ development of both language accuracy and communicative performance in Maritime English.

In this cycle, not only observation from the lecturer, but also the questionnaire which distributed to the students was also the instrument to measure the performance and feedback. The questionnaire items were increase in participation rate with the statement “*I became more active in speaking activities*”, then the improving used of maritime terms in the statement “*Now, I am able to use maritime specific terms vocabulary when speaking*”. Next items were fluency improvement, better grammar and coherence in response, and speaking development. The statements were “*I feel that my spoken English has become more fluent during maritime English practice*”, “*my sentence structure has improved when I speak English in a maritime context*”, and “*practicing speaking over several sessions helped me express ideas more clearly in English.*” The summary result was shown in table

6.

TABLE 6 | Questionnaire Result Cycle 3

| Number | Aspect                                   | Average Rating (out of 5) |
|--------|------------------------------------------|---------------------------|
| 1      | Increase in participation rate           | 4.8                       |
| 2      | Improved used in maritime terms          | 4.5                       |
| 3      | Fluency improvement                      | 4.4                       |
| 4      | Better grammar and coherence in response | 4.5                       |
| 5      | Speaking development                     | 4.7                       |

Based on the data presented in [Table 6](#), the results of the questionnaire in Cycle 3 reflected improved engagement, with the highest ratings in participation (M = 4.8) and speaking development (M = 4.7). This suggests that the integration of ChatGPT fostered greater learner engagement and self-efficacy, supporting prior findings on AI-enhanced motivation (Wang & Kasper, 2022). Importantly, fluency (M = 4.4) and grammatical coherence (M = 4.5) also improved, indicating that AI-based corrective feedback and repetition cycles contributed to automaticity in speech production (DeKeyser, 2007). However, data in cycle 3 revealed that some students experienced hesitation when shifting from AI-supported dialogues to peer interactions, underscoring the need to combine AI practice with collaborative speaking tasks to enhance authentic communicative readiness.

Cycle 4 – Evaluation (Reflections and Performance Analysis)

Finally, post-test was conducted to identify students’ challenges in speaking Maritime English before implementing any instructional interventions. This initial assessment aimed to evaluate their baseline performance across four key aspects of speaking skills such as grammar, vocabulary, fluency, and comprehension within the context of maritime-related topics such as Safety Equipment, Navigation Equipment, and Meteorological Conditions. The post-test was about the students’ performance in explaining and performing dialogs with their peers about the maritime-related topics, they were safety equipment, navigation equipment, and meteorological condition. The observation sample activity was shown in transcription data 5 for the students’ post-test.



Transcription data 5

Student 6: *Good morning. Today we need to talk about the safety equipment on board, right?*

Student 7: *Yes, right. I will start first. Safety equipment are very important to keep the crew safe in emergency situation.*

Student 6: *Yes, I agree. For example, we have lifejackets, lifebuoy, and also fire extinguisher. All must be checked regularly by the crew.*

Student 7: *(nodding) Yes, the officer in charge should make sure everything is in good condition. The lifejackets must be, uh, placed in the locker near the muster station.*

Student 6: *Yes, and lifebuoy should be ready on the deck for man overboard accident.*

Student 7: *We also use fire extinguisher to fight the fire in engine room. But some cadets, they not remember to check the pressure gauge.*

Student 6: *(laughs) Yes, that's true. Sometimes we forget small things like that. During my duty, I always check the label and expiry date.*

Student 7: *Good practice. Also, the emergency light and alarm must be tested every week.*

Student 6: *Oh yes, test every week. And we should record it in the log book or report to the engineer officer.*

Student 7: *So, to conclude, safety equipment must be ready anytime, and every crew have responsibility to maintain it.*

Student 6: *Yes, safety first before everything. Thank you, Ahmad.*

Student 7: *Thank you, Rafi.*

TABLE 7 | Post-test Result

| Topic                     | Grammar | Vocabulary | Fluency | Comprehension | Overall Avg |
|---------------------------|---------|------------|---------|---------------|-------------|
| Safety Equipment          | 83.5    | 87.6       | 85.9    | 89.4          | 86.6        |
| Navigation Equipment      | 86.2    | 91.3       | 88.7    | 93.5          | 88.9        |
| Meteorological Conditions | 82.4    | 86.9       | 84.6    | 88.2          | 85.5        |

For the Safety Equipment topic, students achieved an overall average of 86.6, a noticeable increase from their pre-test average of 74.3 and even higher than the initial post-test score of 83.0. Comprehension remained the strongest aspect (89.4), suggesting better understanding and response accuracy during oral tasks. Grammar and fluency also showed strong improvements, reaching 83.5 and 85.9, respectively. In the Navigation Equipment topic, students recorded the highest overall average of 89.9. This represents outstanding development, particularly in comprehension (93.5) and vocabulary (91.3), reflecting their growing familiarity with technical terminology and ability to use it appropriately in context. Grammar (86.2) and fluency (88.7) scores also indicate more accurate and natural language production during speaking tasks. The topic of Meteorological Conditions, which had the lowest scores in the pre-test, also saw substantial growth, with an overall average of 85.5. Grammar (82.4), vocabulary (86.9), and fluency (84.6) scores reveal increased confidence in discussing weather-related maritime topics, while comprehension (88.2) shows improved listening and interpretive skills during exchanges.

Based on the post-test speaking performance, the students demonstrated an overall improvement in their ability to explain and perform dialogues related to maritime topics, particularly safety equipment. In terms of grammar, their sentences were mostly accurate, though minor mistakes were observed in subject–verb agreement and article usage, such as “*safety equipment are*” instead of “*safety equipment is*.” The vocabulary aspect showed that students appropriately used maritime-related terms like fire extinguisher, pressure gauge, and locker, indicating topic familiarity; however, some repetition suggested a limited lexical range. Regarding fluency, the students spoke smoothly with only a few pauses and filler words such as “*uh*” and “*yes, right,*” showing growing confidence in oral communication. Finally, their comprehension was strong, as both speakers responded logically and maintained coherence throughout the dialogue, despite slight delays in turn-taking. Overall, the students’ post-test performance reflected satisfactory progress across all speaking aspects, with only minor issues in grammatical precision and vocabulary variety. The aspects in the speaking test were the grammar, vocabulary, fluency and comprehension. The pretest result was shown in [table 7](#).

The post-test results, as shown in [Table 7](#), demonstrated a significant improvement in students’ speaking performance in Maritime English following the learning intervention. Each assessed component—grammar, vocabulary, fluency, and comprehension—shows measurable gains across all three maritime-related topics, indicating enhanced communicative competence and confidence in using English within maritime contexts.

Overall, these post-test results reflect the effectiveness of the instructional strategies implemented to improve students’ Maritime English-speaking skills. The consistent upward trend across all language components and topics suggests that learners not only acquired new vocabulary and structures but also developed better fluency, comprehension, and communicative strategies suitable for maritime communication scenarios.

Then, the last questionnaire was distributed to the students. The items were related to the speaking performance improvement such as the improvement of the grammar accuracy, wider range of vocabulary in maritime context, higher comprehension and accurate responses to the questions and instruction in maritime English, and increased fluency with less pauses and hesitation.

The results of the Cycle 4 questionnaire indicated that students perceived substantial improvements in all key aspects of their Maritime English-speaking skills after the ChatGPT-assisted learning intervention. The highest average rating of 4.8 for grammar accuracy improvement suggested that learners acknowledged the effectiveness of the



instructional approach and AI feedback in enhancing their grammatical precision during oral communication. The aspect of wider maritime vocabulary also received a high rating of 4.6, showing that the integration of authentic maritime contexts and repeated AI-guided practice helped students acquire and apply domain-specific terminology more confidently.

TABLE 8 | Questionnaire Result Cycle 4

| Number | Aspect                                           | Average Rating<br>(out of 5) |
|--------|--------------------------------------------------|------------------------------|
| 1      | Grammar accuracy improvement                     | 4.8                          |
| 2      | Wider maritime vocabulary                        | 4.6                          |
| 3      | Higher comprehension and more accurate responses | 4.7                          |
| 4      | Increasing of fluency                            | 4.7                          |

Meanwhile, higher comprehension and more accurate responses as well as increasing fluency both achieved an average rating of 4.7, indicating that students experienced clearer understanding of instructions, better message

interpretation, and smoother speech production. Overall, the consistently high scores across all aspects demonstrated that students not only improved linguistically but also gained greater communicative confidence and motivation. These outcomes confirmed that the ChatGPT-integrated instruction successfully supported both the linguistic and affective domains of Maritime English learning, aligning with previous findings that technology-enhanced and interactive learning environments fostered accuracy, fluency, and learner engagement.

Furthermore, to evaluate the effectiveness of the instructional intervention on students' English-speaking skills, a paired sample t-test was conducted comparing their performance before and after the treatment. The analysis focused on five critical aspects of speaking: grammar, vocabulary, fluency, comprehension, and the overall average score. By comparing the pretest and post-test results, the statistical test aimed to determine whether the observed improvements were significant and consistent across all measured components. The statistical test result was presented in [table 9](#).

TABLE 9 | Result of paired sample t-test

| Aspects         | Pretest Mean | Posttest Mean | Mean Difference | Sig (2 -tailed) | Interpretation                  |
|-----------------|--------------|---------------|-----------------|-----------------|---------------------------------|
| Grammar         | 71.17        | 84.03         | +12.86          | < 0.05          | Significant improvement         |
| Vocabulary      | 76.30        | 88.60         | +12.30          | < 0.05          | Significant improvement         |
| Fluency         | 73.70        | 86.40         | +12.70          | < 0.05          | Significant improvement         |
| Comprehension   | 77.93        | 90.37         | +12.44          | < 0.05          | Significant improvement         |
| Overall Average | 74.80        | 87.00         | +12.20          | < 0.05          | Significant overall improvement |

The results of the Cycle 4 questionnaire indicated that students perceived substantial improvements in all key aspects of their Maritime English-speaking skills after the ChatGPT-assisted learning intervention. The highest average rating of 4.8 for grammar accuracy improvement suggested that learners acknowledged the effectiveness of the instructional approach and AI feedback in enhancing their grammatical precision during oral communication. The aspect of wider maritime vocabulary also received a high rating of 4.6, showing that the integration of authentic maritime contexts and repeated AI-guided practice helped students acquire and apply domain-specific terminology more confidently. Meanwhile, higher comprehension and more accurate responses as well as increasing fluency both achieved an average rating of 4.7, indicating that students experienced clearer understanding of instructions, better message interpretation, and smoother speech production. Overall, the consistently high scores across all aspects demonstrated that students not only improved linguistically but also gained greater communicative confidence and

motivation. These outcomes confirmed that the ChatGPT-integrated instruction successfully supported both the linguistic and affective domains of Maritime English learning, aligning with previous findings that technology-enhanced and interactive learning environments fostered accuracy, fluency, and learner engagement.

The findings across the four research cycles collectively demonstrated a steady and significant improvement in students' Maritime English-speaking proficiency, confirming the effectiveness of ChatGPT-assisted learning.

In Cycle 1, both pretest and questionnaire results revealed that students' main speaking difficulties had been linguistic (limited vocabulary and grammar accuracy) and affective (lack of confidence and anxiety), rather than contextual or situational. These baseline findings justified the need for a targeted instructional approach that focused on vocabulary enrichment, grammatical precision, and communicative confidence. According to [Thi Thuy Ha & Huu Duc \(2024\)](#), speaking difficulties often arose from inadequate linguistic resources and affective barriers, which could be mitigated

through interactive and feedback-rich environments. Therefore, the initial diagnosis set the foundation for employing AI-assisted tasks to provide individualized practice and immediate feedback—factors known to enhance language acquisition (Abusahyon et al., 2023).

By Cycle 2, noticeable progress was evident in vocabulary acquisition, grammatical accuracy, and speaking confidence. This improvement reflected the effectiveness of communicative practice and interaction-based learning integrated with ChatGPT. The results aligned with Bau & Hien (2023), which emphasized that learning occurred through meaningful interaction and scaffolding. ChatGPT served as a dynamic conversational partner, facilitating such scaffolding by providing authentic maritime communication scenarios. Similar findings were reported by Nugroho et al. (2023), who found that AI tools promoted learner engagement and linguistic development in English for Specific Purposes (ESP) contexts through authentic task simulation.

During Cycle 3, the gains became more pronounced across all assessed aspects—grammar, vocabulary, fluency, and comprehension. Students' recorded speaking performances and observational data revealed more accurate sentence construction, wider lexical use, smoother speech delivery, and stronger understanding of maritime discourse. These improvements demonstrated that iterative AI-mediated interactions had fostered automaticity in language use, consistent with Eragamreddy (2025) theory that fluency developed through repeated, meaningful exposure so the integration of ChatGPT simulated this interactive negotiation process, enabling students to self-correct and refine their linguistic output.

In Cycle 4, both quantitative and qualitative data confirmed substantial progress across all language components. The post-test results, supported by the paired sample t-test, revealed statistically significant improvements ( $p < 0.05$ ) in grammar (+12.86), vocabulary (+12.30), fluency (+12.70), and comprehension (+12.44), leading to an overall mean increase from 74.80 to 87.00. This upward trend confirmed that the instructional intervention had produced a systematic and cumulative impact on learners' speaking performance. The highest gain in grammar accuracy suggested that explicit corrective feedback—provided through ChatGPT's responses and lecturer reflections—had helped students internalize correct linguistic forms. This aligned with Van Beuningen (2011) hypothesis and Abdelhalim & Alsehibany (2025), emphasizing the role of comprehensible input and pushed output in developing grammatical competence.

The questionnaire results in Cycle 4 further validated these findings from an affective perspective. Students reported notable increases in confidence, fluency, and comprehension, with average ratings above 4.6 out of 5 across all aspects. This shift indicated that ChatGPT not only enhanced linguistic skills but also reduced anxiety and improved motivation—factors central to affective learning theories (Hayashi & Sato, 2024). The tool's nonjudgmental and interactive nature provided a safe space for practice, thereby fostering willingness to communicate—a critical predictor of speaking success (Zhang et al., 2024).

Overall, these findings substantiated the pedagogical value of AI integration in ESP instruction, particularly within the Maritime English domain. The consistent improvements observed from Cycle 1 to Cycle 4 highlighted the synergy between technology-enhanced interaction, communicative task design, and reflective feedback. Similar studies by Cavazos et al. (2024) and (Almogren et al., 2024) demonstrated that ChatGPT could serve as a transformative medium for language learning, enabling contextualized, self-paced, and confidence-building practice.

In summary, the integration of quantitative and qualitative findings confirmed that ChatGPT-assisted instruction had effectively addressed the linguistic and affective challenges identified at the start of the research. Through iterative practice, personalized feedback, and authentic maritime communication tasks, learners developed measurable gains in grammar, vocabulary, fluency, and comprehension. These results reinforced the theoretical assertion that AI-supported communicative learning enhanced both the cognitive and emotional dimensions of second language acquisition, providing a sustainable model for Maritime English education and broader ESP contexts.

## CONCLUSION

The use of ChatGPT in Maritime English-speaking classes has shown to be an effective tool for enhancing vocabulary, grammar, fluency, and learner confidence. The structured CAR methodology enabled targeted improvements through iterative cycles of action, observation, and reflection. Future implementations should consider expanding the use of AI-based simulations across more maritime communication scenarios and integrating peer-collaborative tasks using ChatGPT.

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**Conflict of Interest Statement:** The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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