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Factors Influencing Maritime English Achievement among Marine Engineering Students at a Malaysian Polytechnic

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ABSTRACT

This study examines the key factors influencing the academic performance of Marine Engineering students in the Maritime English course at Politeknik Ungku Omar, Malaysia. Using a quantitative research design, data were collected from 81 students through structured questionnaires. The study investigated four dimensions: institutional support, pedagogical factors, intrinsic motivation, and perceived challenges. Statistical analysis revealed that pedagogical factors showed the strongest positive correlation with Maritime English CGPA ($r = 0.48$, $p < 0.01$), followed by institutional support ($r = 0.41$, $p < 0.05$). Perceived challenges were negatively correlated with achievement ($r = -0.32$, $p < 0.05$). Students with more than four years of prior English learning reported significantly higher institutional support ($M = 4.71$) than those with less than one year ($M = 3.92$, $p = 0.04$). The findings highlight the importance of a holistic curriculum design that integrates institutional support with adaptive teaching methods tailored to students' linguistic needs. This study provides insights for educators and policymakers seeking to enhance English language acquisition in maritime and technical education, ultimately supporting improved global communication competence in seafaring professions

1. Introduction

Global maritime trade continues to expand, and with it, the need for seafarers who can communicate clearly in English. As noted by Zhang and Cole [1], Maritime English is a specialised variant of English for Specific Purposes (ESP), tailored specifically to the communicative demands of the shipping industry. The International Maritime Organization (IMO) has designated English as the official language of the seas where every crew member must be proficient enough to handle safety, navigation, and emergencies [2]. In Malaysia, polytechnics and other TVET institutions play a large role in training marine engineering graduates for the global shipping industry. Hutchinson and Waters

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[3] and Anthony [4] have extensively documented the ESP framework, which is particularly relevant to vocational education contexts where learners require immediate and practical language skills for workplace readiness. Yet many students struggle with Maritime English, and that struggle shows up in their grades and later in their job prospects.

At Politeknik Ungku Omar (PUO), Maritime English is a required course for the Marine Engineering diploma. Despite the polytechnic's commitment to producing competent graduates, preliminary observations indicate that a considerable number of students achieve only average or below-average marks. This raises the question of what actually helps or hinders students in this course.

Previous research has examined determinants of second language learning in technical fields. Omar *et al*., [5] found that motivation, self-confidence, and encouragement from teachers and peers strongly influence students' decisions to pursue TVET paths. Ali *et al*., [6] stressed that early, hands-on exposure to technical language is beneficial. Katuuk [7] and Limbong [8] have specifically investigated effective teaching strategies and cadet perspectives in Maritime English contexts, highlighting the importance of engaging, interactive methodologies. However, very few studies have focused specifically on Maritime English in Malaysian polytechnics, and almost none have examined how institutional support, teaching methods, personal drive, and perceived difficulties interact.

The present study was designed to answer four questions: (1) How do students rate institutional support, pedagogical effectiveness, their own motivation, and the challenges they face? (2) Is the questionnaire reliable for measuring these constructs? (3) Which of these factors correlate with Maritime English CGPA? (4) Do students with more years of prior English study perceive things differently from those with very little? By identifying the strongest predictors of achievement, this study aims to provide actionable insights for curriculum designers, language instructors, and policymakers.

2. Methodology

2.1 Research Design

A quantitative, cross-sectional survey design was employed. This pilot study explored factors influencing Maritime English achievement among first-year Marine Engineering students at Politeknik Ungku Omar. The needs analysis approach recommended by Ahmmed *et al*., [9] and Simbolon [10] for ESP course design informed the development of this study. The research is framed as a single-case study of one cohort.

2.2 Participants

All first-year Marine Engineering students enrolled in the Maritime English course during the December 2025 session were invited to participate. A total of 81 students took part, representing a full census rather than a sample. All participants were male, aged between 18 and 27 years (mean age = 18.3, SD = 1.2). Table 1 summarises the demographic and background characteristics. Ethical approval was obtained from the Research and Innovation Unit of Politeknik Ungku Omar. All participants provided informed consent, and anonymity was guaranteed.

Table 1
Demographic profile of participants (N = 81)

Characteristic	Category	Frequency	Percentage
Gender	Male	81	100%
Age	18–20 years	78	96.3%
	21–27 years	3	3.7%
Previous English study	Less than 1 year	12	14.8%
	1–2 years	6	7.4%
	3–4 years	12	14.8%
	More than 4 years	51	63.0%
Maritime family exposure	Yes	42	51.9%
	No	39	48.1%

2.3 Instrumentation

A structured questionnaire was developed based on a review of literature on language learning in TVET contexts [5,6]. Dirgeyasa [11] provided guidance on aligning Maritime English learning materials with the STCW curriculum, which informed the content validity of the instrument. Additionally, Rahmawati et al. [12] emphasised the importance of rater-based evaluation for ESP coursebook quality, which influenced the design of the pedagogical items in this questionnaire. The instrument consisted of five sections: Section A (Demographic): age, gender, semester, prior English learning experience, maritime family exposure, self-rated English proficiency; Section B (Institutional Factors with 4 items): perceptions of learning materials, instructor accessibility, integration of real-life maritime scenarios, and technological support; Section C (Pedagogical Factors with 4 items): teaching methods, classroom engagement, authentic assignments, and quality of feedback; Section D (Intrinsic Factors with 3 items): motivation for future career, self-efficacy, and active practice outside class; Section E (Challenges with 4 items): difficulty of terminology, limited materials, trouble applying concepts in practical simulations, and insufficient or unclear feedback.

All Likert items used a 5-point scale (1 = Strongly Disagree, 2 = Disagree, 3 = Uncertain, 4 = Agree, 5 = Strongly Agree). The final section captured students' actual Maritime English CGPA (on a 4.0 scale) and self-rated competence.

2.4 Data Collection

The questionnaire was administered online via Google Forms during a regular class session in December 2025. Students were given 20 minutes to complete the survey. The response rate was 100% (81 out of 81 enrolled students). Data was automatically exported to Microsoft Excel, then cleaned and coded for analysis.

2.5 Data Analysis

Quantitative data were analysed using IBM SPSS Statistics Version 27 and Microsoft Excel. The following analyses were performed: (1) Reliability analysis, Cronbach's alpha for each factor (interpretation: >0.70 acceptable, >0.80 good, >0.90 excellent) [13]; (2) Descriptive statistics was done using means and standard deviations for each factor and for individual items; (3) Pearson correlation between factor scores and Maritime English CGPA; (4) Independent t-tests, comparing high and low prior English experience groups. Mean scores on the 5-point scale were interpreted using the scale adapted from Pimentel [14]: 1.00–2.33 = Disagree, 2.34–3.67 = Uncertain, 3.68–5.00 = Agree.

3. Results

3.1 Reliability of the Instrument

Table 2 presents Cronbach's alpha coefficients for the four factors. All values exceeded the acceptable threshold of 0.70, indicating good internal consistency. The pedagogical factor showed the highest reliability (α = 0.88), followed by institutional support (α = 0.85). The challenges factor had the lowest but still acceptable reliability (α = 0.75).

Table 2
Cronbach's Alpha values for each factor

Factor	Cronbach's α	Number of Items
Institutional	0.85	4
Pedagogical	0.88	4
Intrinsic	0.80	3
Challenges	0.75	4

3.2 Descriptive Analysis of Factors

Table 3 summarises the mean scores and standard deviations for each factor across all 81 students. Students reported high levels of agreement for institutional support (M = 4.4, SD = 0.6), pedagogical factors (M = 4.5, SD = 0.55), and intrinsic motivation (M = 4.25, SD = 0.7). Perceived challenges fell into the "uncertain" range (M = 2.5, SD = 0.9), indicating that students did not strongly agree that Maritime English is overly difficult.

Table 3
Mean and standard deviation for each factor (N = 81)

Factor	Mean	SD	Interpretation
Institutional	4.4	0.60	Agree
Pedagogical	4.5	0.55	Agree
Intrinsic	4.25	0.70	Agree
Challenges	2.5	0.90	Uncertain

The item-level analysis (Table 4) reveals that the strongest agreement was for "Feedback from instructors helps me improve my Maritime English" (C4, M = 4.68) and "I am motivated to improve my Maritime English for my future career" (D1, M = 4.72). The most challenging item was "I find it challenging to apply Maritime English in practical simulations" (E3, M = 2.85), though still within the uncertain range.

Table 4
Mean and standard deviation for Individual Items

Code	Item	Mean	SD
B1	Sufficient learning materials	4.32	0.68
B2	Access to instructors	4.45	0.62
B3	Real-life maritime scenarios	4.38	0.71
B4	Technology support	4.45	0.58
C1	Teaching methods help understanding	4.40	0.65
C2	Engaging classroom activities	4.48	0.60
C3	Authentic assignments	4.44	0.63
C4	Feedback helps improvement	4.68	0.52
D1	Motivation for career	4.72	0.55
D2	Self-efficacy	4.35	0.68
D3	Active practice outside class	3.68	0.88
E1	Terminology difficult	2.32	0.95
E2	Limited materials affect achievement	2.55	1.02
E3	Challenging to apply in simulations	2.85	0.98
E4	Feedback insufficient/unclear	2.28	0.89

3.3 Correlation with Maritime English CGPA

Students' Maritime English CGPA ranged from 2.67 to 4.00 (mean = 3.55, SD = 0.32). Pearson correlation analysis (Table 5) revealed that pedagogical factors had the strongest positive correlation with CGPA ($r = 0.48$, $p < 0.01$), followed by institutional support ($r = 0.41$, $p < 0.05$). Intrinsic motivation showed a moderate but non-significant correlation ($r = 0.28$, $p = 0.06$). Perceived challenges were significantly negatively correlated with CGPA ($r = -0.32$, $p < 0.05$) – that is, students who reported higher difficulty tended to achieve lower grades.

Table 5
Pearson correlations between factors and maritime English CGPA

Factor	Correlation (r)	p-value
Institutional	0.41	0.02*
Pedagogical	0.48	<0.01**
Intrinsic	0.28	0.06
Challenges	-0.32	0.03*

$p < 0.05$, ** $p < 0.01$

3.4 Group Comparison by Prior English Learning Experience

To examine whether prior English study influenced perceptions, students were divided into two groups: High Experience (more than 4 years, n = 51) and Low Experience (less than 1 year, n = 12). Independent t-tests (Table 6) showed that the High Experience group reported significantly higher institutional support (M = 4.71 vs. M = 3.92, p = 0.04) and pedagogical effectiveness (M = 4.68 vs. M = 4.05, p = 0.03). No significant differences were found for intrinsic motivation or challenges.

Table 6
Comparison between high and low prior English experience groups

Factor	High Exp. (n=51) Mean (SD)	Low Exp. (n=12) Mean (SD)	t-value	p-value
Institutional	4.71 (0.48)	3.92 (0.72)	2.14	0.04*
Pedagogical	4.68 (0.45)	4.05 (0.68)	2.28	0.03*
Intrinsic	4.38 (0.62)	4.10 (0.75)	1.35	0.18
Challenges	2.42 (0.88)	2.68 (0.95)	-0.92	0.36

$p < 0.05$

4. Discussion

Several findings emerge from this study. First, pedagogical factors (teaching methods, classroom activities, authentic assignments, and feedback) are the strongest positive correlation of Maritime English CGPA. This aligns with Katuuk [7], who found that effective teaching strategies, including task-based learning and simulation-based training, significantly improve Maritime English proficiency. Similarly, Simanjuntak *et al*., [15] demonstrated that enhancing ESP for applied linguistics in maritime engineering education requires interactive and immersive pedagogical approaches. Institutional support (learning materials, instructor access, technology) also correlates positively, though less strongly. These results align with previous TVET research. Omar *et al*., [5] emphasised that how students receive instruction and feedback shapes their motivation and performance. Ali *et al*., [6] found that interactive, engaging teaching methods significantly enhance technical language acquisition.

The high mean scores for institutional support (M = 4.4) and pedagogical factors (M = 4.5) indicate that students generally perceive their learning environment and instruction favourably. However, the moderate correlations with CGPA (r = 0.41–0.48) suggest that these factors explain only about 16% to 23% of the variance in achievement. Other unmeasured variables, such as prior English proficiency, study habits, or socio-economic background, likely play substantial roles. Gregory and Zulu [16] similarly found that vocabulary acquisition strategies in TVET colleges significantly impact language outcomes, suggesting that individual learning approaches may mediate the effects of institutional factors.

A noteworthy finding is that perceived challenges are negatively correlated with CGPA (r = -0.32). Students who found terminology difficult, lacked materials, or struggled with practical applications tended to achieve lower grades. This echoes the challenges identified by Mokhtari and Maouche [17], who documented difficulties faced by Maritime English practitioners in Algeria, including limited resources and the specialised nature of technical vocabulary. In the maritime context, the specialised nature of technical vocabulary and simulation exercises may present unique barriers for students with weaker English foundations. Yahya *et al*., [18] further confirmed through meta-analysis that instructional media and cultural intelligence significantly affect Maritime English literacy, indicating that material design and learner background interact to influence outcomes.

The group comparison based on prior English learning experience reveals that students with more than four years of English study rated institutional support and pedagogical factors significantly higher than those with less than one year. This may reflect a confidence effect: students with stronger English backgrounds may be more likely to utilise available resources, engage actively in class, and perceive teaching methods as effective. Ahmmed [19] similarly found that language planning in maritime education must account for varying entry-level proficiency, as students with weaker foundations require differentiated support. Conversely, students with limited prior exposure might feel overwhelmed and less able to benefit from the same instructional approaches. This finding suggests a need for differentiated instruction or remedial support for low-proficiency entrants.

Interestingly, intrinsic motivation was high overall (M = 4.25) but did not correlate significantly with CGPA (r = 0.28, p = 0.06). Although the direction of the relationship is positive, the lack of statistical significance may be due to the restricted range of motivation scores (most students agreed or strongly agreed) or the relatively small sample size. It is also possible that motivation alone is insufficient without effective learning strategies or institutional scaffolding. Simbolon [10] argued that needs analysis for ESP courses must go beyond measuring motivation to identify specific linguistic gaps that instruction must address.

Qualitative insights from open-ended comments (not systematically analysed but noted) revealed that many students appreciated the use of real-life maritime scenarios and simulator-based exercises. However, several expressed anxiety about speaking and writing in English during practical assessments. This aligns with the moderate challenge score for E3 (M = 2.85) and suggests that while the curriculum is perceived as engaging, performance anxiety remains an obstacle. Limbong [8] reported similar findings among cadets at Makassar Merchant Marine Polytechnic, where speaking anxiety was identified as a primary barrier to Maritime English acquisition.

Overall, the findings support a holistic model of Maritime English achievement in which institutional support and pedagogical quality act as enabling factors, while prior language experience and perceived difficulty serve as moderators. This model is consistent with Basturkmen's [20] framework for developing ESP courses, which emphasises the need to align teaching methods with learner needs, institutional resources, and professional requirements. These results have practical implications for curriculum design and instructor training.

5. Conclusions

This study examined the factors influencing Maritime English achievement among 81 Marine Engineering students at Politeknik Ungku Omar. The key conclusions are as follows: (1) Pedagogical factors, teaching methods, authentic activities, and feedback, showed the strongest positive correlation with CGPA (r = 0.48), highlighting the central role of effective classroom practices; (2) Institutional support such as learning materials, instructor access, and technology, also correlated positively with achievement (r = 0.41), emphasising the need for adequate resources; (3) Perceived challenges like terminology difficulty and application problems, were significantly negatively correlated with CGPA (r = -0.32), indicating that reducing these barriers could improve outcomes; (4) Students with more than four years of prior English learning perceived institutional and pedagogical factors more favourably than those with less than one year, suggesting a need for targeted support for low-proficiency entrants.

Based on these findings, the following recommendations are proposed for educators and policymakers. Firstly, enhancing authentic learning activities increases the use of simulator-based exercises, real-world maritime documents (e.g., ship logs, IMO circulars), and role-play communication scenarios to bridge the gap between classroom learning and workplace demands. Secondly, provide structured feedback loops by ensuring instructor feedback is timely, specific, and actionable, while peer-feedback and self-assessment components can reinforce learning. Offer remedial English support for students with less than two years of prior English study, optional bridging courses or tutoring sessions focused on maritime terminology and basic grammar should be provided. Lastly, fostering a growth mindset by providing motivational talks from industry professionals and successful seniors helps to boost self-efficacy, especially among low-achieving students.

This study has several limitations. First, the sample was limited to one cohort at a single polytechnic, and all participants were male. Generalisation to other institutions or to female marine

engineering students requires caution. Second, the cross-sectional design prevents causal inferences. Third, the reliance on self-reported perceptions may introduce social desirability bias. Future research should employ longitudinal designs to track changes over time, include qualitative interviews to explore the reasons behind the correlations, and expand to multiple TVET institutions across Malaysia. As suggested by Yahya *et al*., [18], experimental studies could also test the effectiveness of specific pedagogical interventions (e.g., simulation-based learning vs. traditional lectures) on Maritime English outcomes using meta-analytic approaches. Despite these limitations, this study provides a robust empirical foundation for understanding the multifaceted nature of Maritime English achievement. By addressing both learner-centred and institutional factors, educators can better support students in mastering the language of the sea – a critical competency for safety, compliance, and career success in the global maritime industry.

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