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Navigating Technical Communication Barriers: Maritime English Proficiency Among Engine Room Cadets in Multicultural Training Environments

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Abstract. *The global maritime industry operates within a complex multilingual environment in which English functions as the dominant medium of professional communication. In engine rooms — where technical precision and operational safety are paramount — communication failures among multinational crews have been repeatedly identified as contributing factors in maritime incidents. This study investigates Maritime English proficiency among engine room cadets from South Korea, the Philippines, and Indonesia through an ethnographic multi-case design. Using structured observation, semi-structured interviews, focus group discussions, and cross-group comparison, the study examines how language barriers manifest in technical machinery contexts and how instructional environments shape cadets' communicative competencies. Findings reveal that Filipino cadets demonstrate comparatively higher confidence in spoken Maritime English, attributable to English-medium technical instruction, while South Korean and Indonesian cadets face significant lexical and syntactic challenges, particularly in operating manual interpretation and emergency communication protocols. The study contributes a tri-national comparative framework for Maritime English pedagogy and offers evidence-based recommendations for multicultural cadet training programs aligned with STCW Convention requirements.*

Keywords: *Maritime English; engine room communication; multicultural cadets; technical language proficiency; ethnographic study*

1. Introduction

The engine room of a modern vessel represents one of the most linguistically demanding professional environments in the global maritime sector. Within this space, where propulsion systems, auxiliary machinery, and automated control networks converge, communication must be precise, immediate, and technically accurate. Yet the multinational composition of contemporary ship crews means that engine room personnel routinely operate across multiple first languages, educational traditions, and communicative norms. The consequences of linguistic failure in such environments are not merely academic — they are operational, regulatory, and, at their most critical, life-threatening. This fundamental tension between technical precision and linguistic diversity constitutes the central problem animating the present study.

The International Maritime Organization (IMO), through the Standards of Training, Certification and Watchkeeping (STCW) Convention, mandates English as the working language of international shipping and specifies minimum proficiency requirements for seafarers engaged in watchkeeping operations. Despite this global regulatory framework, the implementation of Maritime English training varies considerably across national maritime education systems. National integrated maritime

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policies — which establish the institutional frameworks within which cadet training occurs — differ substantially in their prioritization of language competency development (Paridaens & Notteboom, 2021). As shipping operations become increasingly automated and technically complex, the communicative demands placed on engine room officers have intensified correspondingly (Zhang et al., 2022). Against this backdrop, the gap between regulatory aspiration and institutional reality in Maritime English education has emerged as a pressing and underexplored research concern.

South Korea, the Philippines, and Indonesia represent three of the most significant seafarer-supplying nations in the Asia-Pacific region, yet they differ markedly in their English education traditions, maritime training cultures, and cadet preparation systems. The Philippines has long benefited from English as a co-official language, producing seafarers whose English fluency is widely recognized in the global maritime labor market. South Korea and Indonesia, by contrast, rely on second-language English instruction integrated within largely mother-tongue academic environments, producing cadets whose English competencies — particularly in technical and domain-specific registers — present distinctive challenges. These differences are further complicated by the emerging role of technology-assisted language learning in maritime education (Buddha et al., 2024), the growing adoption of digital and mobile learning platforms in adult professional training contexts (Sabri et al., 2022), and the recognized need for maritime instructors themselves to demonstrate robust digital and information literacy in guiding technically demanding curricula (Fernández Otoya et al., 2024).

Crucially, the body of existing research on Maritime English proficiency has addressed the field primarily through monolingual or single-nationality lenses. Studies examining Filipino seafarers, Korean maritime cadets, or Indonesian trainees exist in relative isolation, rarely engaging in systematic cross-national comparison within a unified analytical framework. The consequence is a fragmented knowledge base that understates the complexity of multicultural engine room communication and offers limited practical guidance for training institutions seeking to prepare cadets for genuinely multilingual operational environments. Furthermore, as Meier et al. (2020) demonstrate, language use in digitally mediated professional environments is shaped not only by proficiency levels but by broader patterns of linguistic stereotyping and differential status — patterns that may operate in engine room training settings along national identity lines and produce communicative hierarchies that inhibit collaborative technical practice.

The present study addresses this gap by adopting an ethnographic multi-case design

to examine Maritime English proficiency among engine room cadets from South Korea, the Philippines, and Indonesia. Rather than relying on standardized test scores or self-reported competency measures alone, this study investigates how language barriers manifest in situated, technically demanding contexts: operating manual interpretation, machinery alarm response, inter-departmental communication, and emergency protocol execution. By positioning language not merely as a measurable skill but as a socially embedded and institutionally shaped practice, the study seeks to generate insights that are both analytically nuanced and practically actionable.

The study pursues three interrelated objectives: first, to document the nature and frequency of Maritime English communication challenges experienced by cadets from each national context; second, to compare institutional and pedagogical factors that shape cadets' technical language development across the three nations; and third, to develop a cross-nationally informed framework for Maritime English pedagogy in multicultural training environments. The overarching research question guiding the study is: How do Maritime English proficiency patterns and communication barriers differ among South Korean, Filipino, and Indonesian engine room cadets within multicultural maritime training environments, and what institutional and pedagogical factors account for these differences?

The significance of this study extends across multiple dimensions. Theoretically, it contributes to the emerging intersection of Maritime English studies, applied linguistics, and multicultural professional communication research. Empirically, it generates comparative data across three nationally distinct cadet populations, addressing a critical void in the literature. Practically, its findings offer direct implications for STCW-aligned curriculum development, maritime instructor preparation, and the design of technology-supported language learning environments suited to the technical demands of engine room operations. As the maritime industry continues its trajectory toward greater automation, operational complexity, and multinational crew composition (Chae et al., 2021), the capacity of engine room cadets to communicate with precision across linguistic boundaries becomes not merely a pedagogical concern but a fundamental dimension of maritime safety governance.

2. Literature Review

2.1 Conceptual Foundations: Maritime English as Technical and Professional Communication

Maritime English occupies a distinctive position within the broader field of English

for Specific Purposes (ESP). Unlike general English or even general professional English, it operates within a domain where communicative precision directly intersects with technical operational safety. In this context, language competency is not reducible to grammatical accuracy or vocabulary breadth alone; it encompasses the ability to interpret technical documentation, issue and receive operational instructions under time pressure, and navigate emergency communication protocols across potentially multilingual crew compositions. The STCW Convention's language provisions reflect this understanding, yet the practical operationalization of those provisions within national training institutions remains inconsistent (Paridaens & Notteboom, 2021), producing structural disparities in cadet preparedness that the present study seeks to document and analyse.

Contemporary discussions of technical and professional language learning increasingly recognize the transformative role of digital and technology-mediated instructional approaches. Buddha et al. (2024), in their systematic literature review of technology-assisted language learning systems, identify adaptive learning platforms, simulation-based environments, and interactive digital tools as central to effective language development in professional and vocational contexts. These findings are directly relevant to Maritime English training, where simulation environments function as primary pedagogical vehicles. Similarly, Sabri et al. (2022) demonstrate through a comprehensive survey of mobile learning for adult learners that context-specific, flexible, and technology-enhanced learning environments produce superior engagement and retention outcomes compared to traditional lecture-based instruction — a finding with significant implications for maritime cadet populations, who are adult learners operating within highly specialized vocational contexts with compressed training timelines.

2.2 Cross-Cultural and Multilingual Dimensions of Professional Communication

The cross-cultural dimensions of professional communication in high-stakes technical environments have attracted growing scholarly attention in recent years. Meier et al. (2020) demonstrate that language use in digitally mediated professional environments carries embedded cultural and identity markers that shape how speakers are evaluated and positioned within professional hierarchies. In engine room contexts, where authority, expertise, and operational status are communicated through language as much as through formal rank, these dynamics acquire particular salience. Cadets whose English diverges from perceived norms of technical fluency may face communicative disadvantages that extend beyond vocabulary or syntax to encompass professional credibility and operational authority — a finding that has direct consequences for safety

culture in multinational crew environments.

Yuebo et al. (2024) offer complementary insights through their investigation of online learning success models for adult learners in open and distance education contexts, finding that learners' self-efficacy, institutional support, and the design quality of learning environments interact to determine communicative and academic outcomes. These factors translate meaningfully to the Maritime English training context, where cadets from different national backgrounds bring differential levels of confidence, institutional preparation, and access to language support resources. Experiential and simulation-based learning approaches, as examined by Adnan et al. (2023) in their review of robotics and computational experiential learning, further highlight the critical importance of contextual embedding in technical skill development — a principle directly applicable to engine room communication training, where language and technical procedure are inseparable in practice.

2.3 Empirical Landscape and Identified Research Gaps

Prior empirical research on Maritime English has tended to concentrate on communication failures at the bridge level, reflecting the higher visibility of navigational incidents in maritime accident documentation. Engine room communication, despite being implicated in a substantial proportion of machinery-related incidents, has received comparatively limited systematic scholarly attention. Studies examining Southeast and East Asian cadet populations have been further constrained by single-nationality research designs, limiting the transferability of findings to genuinely multinational operational contexts. Fernández Otoya et al. (2024) note analogous limitations in the broader educational research literature, where culturally and contextually specific studies frequently fail to generate comparative insights capable of informing cross-national policy or professional practice.

Bibliometric analyses of research trends in maritime and technical education (Shi et al., 2023) confirm that while technology integration in maritime training has attracted growing scholarly interest, the intersection of language competency, multicultural crew dynamics, and engine room operations remains a comparatively underexplored research domain. The application of collaborative research modeling frameworks (Husain et al., 2021) to this interdisciplinary space supports the present study's positioning as an inquiry that bridges applied linguistics, maritime education, and multicultural professional communication. Widnall et al. (2024), in their realist-informed review of peer education interventions in professional development contexts, further demonstrate the value of

socially embedded, context-sensitive approaches to competency development — an insight that informs the present study's ethnographic methodology and its analytical attention to the institutional and social conditions shaping cadets' language development.

2.4 Conceptual Position of the Present Study

Synthesizing these theoretical and empirical threads, the present study positions Maritime English proficiency not as a fixed individual attribute but as a socially constructed, institutionally shaped, and technologically mediated capability. This conceptual stance argues that understanding communication barriers among multicultural cadets requires attending simultaneously to the pedagogical environments in which cadets are formed, the technological resources available to support their language development, the cultural and linguistic identities they bring to training contexts, and the institutional policies that govern their language learning opportunities. This integrated framework directly informs the study's ethnographic design, its cross-group comparison methodology, and its analytical focus on patterns of communicative practice rather than isolated proficiency measures — enabling the generation of findings with both theoretical relevance and direct pedagogical application.

3. Method

This study employs an ethnographic multi-case research design to investigate Maritime English proficiency and communication barriers among engine room cadets from South Korea, the Philippines, and Indonesia. The ethnographic orientation was selected on the grounds that it enables sustained, contextually embedded examination of communicative practices as they occur within authentic training environments, thereby generating data of substantially greater ecological validity than survey instruments or standardized proficiency tests alone can produce. This methodological rationale aligns with established approaches to investigating language use in professional and vocational settings, where meaning is constructed through situated interaction rather than isolated linguistic performance, and where institutional structures shape what communication practices are possible (Husain et al., 2021; Shi et al., 2023).

The study population comprised 45 engine room cadets enrolled in accredited maritime training institutions: 15 from a government-designated maritime polytechnic in South Korea, 15 from a maritime academy in the Philippines, and 15 from a maritime higher education institution in Indonesia. Participants were selected through purposive sampling, with inclusion criteria specifying enrollment in engine room watchkeeping programs, completion of at least one semester of Maritime English instruction, and

willingness to participate in extended observation and interview procedures. Three Maritime English instructors per institution — a total of nine — were also recruited as key informants. This sampling approach ensured national representativeness while enabling the depth of individual-level engagement required by the ethnographic design.

Data were collected through three primary instruments. First, structured non-participant classroom and simulation observation sessions were conducted over a four-week period at each institution, generating 60 hours of observation per site with systematic field notes focused on cadets' English use in technical communication tasks. Second, semi-structured individual interviews were conducted with all 45 cadets and all nine instructors, examining perceptions of communication challenges, language confidence, instructional approaches, and institutional language support structures. Third, one focus group discussion per national cohort was facilitated to elicit comparative and reflective perspectives on cross-national communication experiences during mixed-nationality simulation exercises. Supporting documentary data were obtained through analysis of institutional Maritime English curricula and STCW compliance documentation. The integration of observation, interview, and documentary data reflects the triangulation principle advocated for ethnographic inquiry in professional learning contexts (Widnall et al., 2024; Adnan et al., 2023).

Data analysis proceeded through three sequential and iterative procedures. Thematic Analysis was applied to all interview and focus group transcripts, with codes organized around the study's central constructs of technical vocabulary, syntactic proficiency, intercultural communication dynamics, and emergency protocol language. Cross-group Comparison was then applied systematically to identify convergences and divergences across the three national cohorts, examining patterns in relation to institutional, pedagogical, and biographical factors documented during observation. Finally, Narrative Synthesis was employed to integrate the thematic and comparative findings into a coherent interpretive account that directly addresses the study's research question and objectives. The analytical process was conducted by two independent coders to enhance reliability, with discrepancies resolved through consensus review. Member checking with a subsample of five participants per site further enhanced the credibility of interpretations.

4. Results and Analysis

4.1 Overview of Findings

Analysis of observation data, interview transcripts, and focus group discussions

produced a rich and complex landscape of Maritime English proficiency and communication barriers across the three national cadet cohorts. Rather than generating a simple hierarchy of competency, the findings reveal that each national group demonstrates distinctive strengths and vulnerabilities across different dimensions of Maritime English use, shaped by the intersection of instructional history, institutional policy, technological exposure, and intercultural dynamics. The results are organized across four thematic dimensions: technical vocabulary mastery, syntactic and discourse-level proficiency, intercultural communication dynamics, and emergency communication performance.

4.2 Technical Vocabulary Mastery

Across all three cohorts, technical vocabulary emerged as the most frequently cited and observationally confirmed source of Maritime English communication difficulty. Table 1 presents a comparative summary of vocabulary performance scores across the three national groups, organized by key engine room operational domains. Scores represent combined averages of instructor observation ratings and cadet self-assessments on a scale of 1 to 10.

Table 1. Comparative Maritime English Technical Vocabulary Performance Across National Cohorts

Operational Domain	South Korean Cadets (Mean /10)	Filipino Cadets (Mean /10)	Indonesian Cadets (Mean /10)
Propulsion system terminology	5.8	8.2	6.1
Auxiliary machinery nomenclature	5.3	7.9	5.7
Alarm and emergency vocabulary	4.9	8.5	5.2
Operating manual interpretation	5.1	8.0	5.4
Inter-departmental communication	6.2	8.7	6.0
Overall Mean	5.46	8.26	5.68

Note. Scores represent combined averages of instructor observation ratings and cadet self-assessment. Scale: 1–10. N = 15 per cohort.

The data presented in Table 1 reveal a consistent and analytically significant pattern: Filipino cadets scored substantially higher across all five operational domains, recording an overall mean of 8.26, compared to 5.68 for Indonesian cadets and 5.46 for South Korean cadets. This cross-domain performance gap is particularly pronounced in the alarm and emergency vocabulary domain, where South Korean cadets recorded the lowest mean score in the study (4.9) — a finding that carries direct implications for operational safety in multinational crew contexts. Observation data corroborated these

quantitative patterns, with field notes documenting frequent instances of South Korean cadets reverting to Korean-language internal communication during complex machinery procedures before attempting English-medium reporting.

Filipino cadets' comparatively strong performance across all vocabulary domains is consistent with the broader institutional context in which they train. Instructors at the Philippine institution confirmed that Maritime English content is integrated throughout the technical curriculum from the first semester of cadet enrollment, with English functioning as the primary medium of instruction across all machinery-related courses. This structural immersion appears to accelerate vocabulary development in ways that dedicated but temporally isolated Maritime English courses — the dominant model at both the South Korean and Indonesian institutions — do not replicate. This finding is directly consistent with Buddha et al.'s (2024) argument that language learning systems achieve greatest effectiveness when domain-relevant content and language instruction are integrated within authentic professional learning environments, rather than delivered as independent instructional tracks.

4.3 Syntactic and Discourse-Level Proficiency

Beyond lexical competency, observation and interview data revealed significant cross-national differences in cadets' ability to produce grammatically coherent and communicatively effective discourse in technical English contexts. This dimension proved particularly consequential in tasks requiring extended technical explanations, such as machinery fault reporting, procedural briefings to superiors, and handover communication during watchkeeping transitions. Figure 1 presents the distribution of discourse-level proficiency ratings — classified as Advanced, Intermediate, or Basic — across the three national cohorts, as assessed through structured simulation observation.

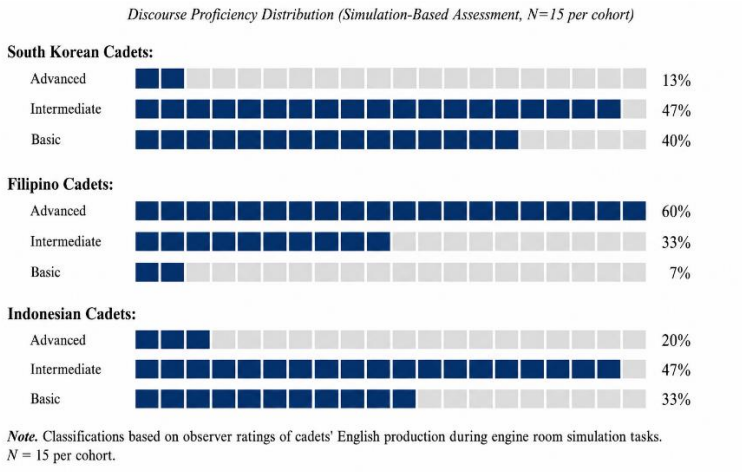

Figure 1. Distribution of Discourse-Level Maritime English Proficiency by National Cohort (%)

The distribution illustrated in Figure 1 confirms and extends the vocabulary findings, demonstrating that the majority of South Korean cadets (40%) operated at a Basic discourse level during simulation tasks, while the overwhelming majority of Filipino cadets (60%) were assessed at the Advanced level. Indonesian cadets occupied a somewhat stronger position than their South Korean counterparts, with 20% reaching the Advanced classification, yet the proportion rated Basic (33%) remains operationally significant. These patterns reflect not merely individual proficiency differences but systemic outcomes of distinct institutional language learning environments.

Interview data provided crucial interpretive depth for these quantitative patterns. Indonesian cadets consistently reported that Maritime English instruction at their institution prioritized reading comprehension and written examination over oral production, resulting in a pronounced receptive-productive asymmetry: they could decode technical English documentation with reasonable accuracy but experienced significant difficulty producing spontaneous oral technical communication under operational time pressure. South Korean cadets, by contrast, reported confidence in general English grammar but described a persistent "terminology gap" — a relatively strong grasp of everyday English syntax combined with severely limited domain-specific maritime vocabulary — that rendered their technical communication imprecise even when formally grammatical. As one South Korean cadet reflected during interview: *"I know the English grammar, but in the engine room, the words are all new. I cannot say what I see in the machine."* This profile aligns with Sabri et al.'s (2022) identification of context-specificity as a critical variable in adult language learning success, underscoring that general English proficiency does not transfer automatically to technically specialized professional registers.

4.4 Intercultural Communication Dynamics

Ethnographic observation of mixed-nationality simulation exercises — in which cadets from different national cohorts were paired or grouped for collaborative engine room tasks — generated particularly significant data regarding the interpersonal and communicative dynamics of multicultural engine room operations. Three analytically distinct patterns emerged from cross-group interaction data, each carrying implications for the design of multicultural maritime training environments.

The first pattern, communication asymmetry, was consistently observed across mixed-group exercises, with Filipino cadets assuming de facto linguistic authority regardless of formal role assignments. While this dynamic proved pragmatically efficient

in terms of task completion times, it simultaneously reduced the communicative participation and confidence of South Korean and Indonesian cadets. As one Indonesian cadet articulated during interview: *"When working with Filipino classmates, I understand but I stop trying to speak. They speak so fast and correctly. I feel my English is not enough."* This pattern resonates with Meier et al.'s (2020) findings regarding the differential social valuation of language varieties in professional environments, where perceived linguistic prestige shapes participation patterns and may entrench communicative hierarchies that have no basis in formal organizational structure.

The second pattern concerns the differential adoption of technology-mediated language support. Table 2 presents a comparative summary of communication behavior patterns observed across the three national cohorts during mixed-nationality simulation exercises.

Table 2. Summary of Cross-Group Communication Behavior Patterns in Mixed-Nationality Simulation Exercises

Communication Behavior	South Korean Cadets	Filipino Cadets	Indonesian Cadets
Technology-assisted preparation (% frequent users)	73%	27%	53%
Oral participation rate in mixed groups	Low	High	Moderate
Use of formulaic communication strategies	High	Low	High
Reversion to L1 during complex tasks (% observed)	67%	13%	53%
Confidence in emergency English communication	Low	High	Moderate

Note. Based on structured observation coding and self-report survey. N = 15 per cohort, across six mixed-group simulation sessions.

As Table 2 demonstrates, South Korean cadets recorded the highest usage of digital translation and vocabulary reference tools (73% frequent users), consistent with the pattern identified by Buddha et al. (2024) in which technology-assisted tools are most heavily adopted by learners whose instructional environments offer limited opportunities for oral practice immersion. While this technological resource-seeking reflects legitimate adaptive strategies, it may paradoxically delay the development of independent technical English fluency by providing immediate lexical resolution without demanding active language production — a concern analogous to the technology-dependency patterns noted by Fernández Otoya et al. (2024) in digitally supported professional learning environments.

The third pattern, face-saving communication strategies, was consistently observed across both South Korean and Indonesian cadets, who frequently employed formulaic

English phrases — technically recognizable but semantically underdetermined — to maintain communicative participation without exposing vocabulary limitations. While such strategies preserve social harmony within training group dynamics, they represent a significant operational risk in genuine emergency contexts where precise, specific technical information is critical to appropriate response.

4.5 Emergency Communication Performance

Emergency communication tasks — specifically, machinery alarm response drills in which cadets were required to issue verbal technical reports in English within specified time parameters — produced the starkest cross-national performance contrasts of the entire study. These tasks assessed the simultaneous convergence of vocabulary, syntactic fluency, and communicative confidence under simulated operational time pressure, representing the highest-stakes dimension of engine room English use. South Korean cadets recorded the lowest mean response accuracy rate (58%), followed by Indonesian cadets (67%) and Filipino cadets (89%).

These findings carry substantial implications for STCW compliance assessment. Instructors across all three institutions identified emergency English communication as the competency area of greatest concern within their respective institutional obligations, suggesting that the gap between regulatory requirement and observed cadet performance is recognized institutionally even where systematic structural responses remain underdeveloped. Online and blended learning initiatives targeting emergency communication language — of the type described by Yuebo et al. (2024) in their study of adult distance learning success — have been piloted at the Indonesian institution with preliminary evidence of improved cadet confidence ratings, though no formal longitudinal outcome data were available at the time of the present study. This observation points toward an emerging institutional awareness of the need for more systematic, technology-enhanced approaches to emergency Maritime English instruction, consistent with the experiential and simulation-integrated learning trajectory identified by Adnan et al. (2023) as most effective for complex professional skill development.

5. Discussion

The findings of this study generate several analytically significant insights into the nature of Maritime English proficiency barriers among multicultural engine room cadets, with important implications for pedagogy, institutional policy, and maritime safety governance.

The consistent performance advantage of Filipino cadets across all measured

dimensions of Maritime English competency confirms that English-medium instructional environments — particularly those integrating language development throughout technical course content rather than delivering it as a discrete and temporally isolated subject — produce substantially stronger domain-specific communicative capabilities. This finding directly challenges the common institutional assumption that Maritime English instruction can be effectively delivered independent of the technical content it serves. The pattern corroborates Buddha et al.'s (2024) argument that language learning systems achieve greatest effectiveness when embedded in domain-relevant, contextually authentic environments, and extends this principle specifically to the high-stakes, technically specialized context of engine room operations.

The vocabulary-discourse asymmetry observed among Indonesian cadets — where receptive proficiency in reading technical English exceeded productive oral competency — presents a pedagogically critical finding with immediate curricular implications. This profile reflects instructional environments that, as Sabri et al. (2022) caution in their survey of adult mobile learning, over-prioritize literacy-based assessment at the expense of oral and interactive communicative development. In engine room contexts, where real-time oral communication during machinery operations is an operational necessity rather than an ancillary skill, this asymmetry represents a specific and addressable curricular vulnerability. Institutions relying primarily on written examinations to assess Maritime English competency may be systematically overestimating their cadets' operational communicative readiness — a misalignment with STCW intent that warrants urgent policy-level attention.

The observed linguistic authority asymmetry in mixed-nationality simulation exercises has implications that extend beyond individual cadet development. As Meier et al. (2020) demonstrate, language-based status differentials in professional environments can entrench patterns of communicative exclusion that undermine collaborative effectiveness independently of formal organizational hierarchy. In engine room contexts, the suppression of active oral participation among South Korean and Indonesian cadets in the presence of more fluent English speakers may — if reproduced in operational vessel settings — produce communication structures where critical technical information fails to surface not because of absent knowledge but because of linguistic hierarchy. Peer education designs of the type reviewed by Widnall et al. (2024) offer a potentially valuable remedial strategy: structured peer interaction that deliberately redistributes communicative authority within training groups could counteract the asymmetric participation patterns

documented in this study.

The study's findings also illuminate the complex role of technology in both addressing and potentially circumventing language barriers. South Korean cadets' high reliance on digital translation tools, while reflecting legitimate adaptive strategies in the face of limited instructional oral practice opportunities, may — as Fernández Otoya et al. (2024) caution — mask underlying competency gaps by substituting tool-mediated resolution for active language production. This finding suggests that maritime English instructors require specific pedagogical preparation in managing technology-supported learning environments in ways that promote, rather than substitute, independent technical English development.

Several limitations of the study warrant acknowledgment. The sample of 15 cadets per national cohort, while appropriate for ethnographic depth, constrains the generalizability of quantitative performance comparisons to the broader cadet populations of each nation. The study was conducted within land-based training institutions rather than operational vessel environments, and the extent to which simulation-based communication performance translates to underway engine room operations remains an important question for future investigation. Future research should pursue longitudinal designs that track cadets through sea service phases, extend the comparative framework to additional seafarer-supplying nations, and investigate the effectiveness of specific pedagogical interventions — including technology-integrated oral practice, immersive simulation, and structured multilingual peer collaboration — in narrowing identified competency gaps.

6. Conclusion

This study has demonstrated that Maritime English proficiency among South Korean, Filipino, and Indonesian engine room cadets is shaped by a complex interaction of instructional history, institutional policy, technological engagement, and intercultural communicative dynamics. Filipino cadets' consistent performance advantage across technical vocabulary, discourse fluency, and emergency communication reflects the structural benefit of English-medium technical instruction, while the vocabulary-discourse asymmetry among Indonesian cadets and the terminology gap identified among South Korean cadets reveal institutionally addressable competency vulnerabilities of direct relevance to STCW compliance. The study's cross-national ethnographic comparative framework offers a contextually grounded and pedagogically actionable foundation for the development of Maritime English curricula, instructor preparation programs, and assessment instruments responsive to the realities of multicultural engine room training

environments in the Asia-Pacific maritime education landscape.

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