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Communication Across Cultures at Sea: A Study of Multimodal Communication Competence Development in Multilingual, Multinational Maritime Bridge Environments

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ABSTRACT

Modern container and tanker vessels operate with multinational crews speaking diverse first languages, yet maritime communication remains heavily dependent on standardized English procedures and International Maritime Organization protocols. This ethnographic study examined communication practices aboard 22 commercial vessels over 20 months, combining 224 hours of bridge observation, analysis of 163 audio-recorded bridge operations, 64 semi-structured interviews, and review of 52 communication-related incident reports. Findings reveal tension between standardized English-only maritime communication protocols and practical multilingual realities aboard vessels where officers from Philippines, Eastern Europe, India, Myanmar, and other nations communicate with varying English proficiency. Quantitative analysis of bridge communications revealed that 38% of operational communications contained code-switching (mixing English with officers' first languages), 31% included non-verbal communication elements critical for comprehension, and 44% of junior officers from non-English-speaking backgrounds requested clarification at least weekly. Qualitative analysis identified communication barriers: limited vocabulary among non-native English speakers for novel situations, cultural communication style differences (direct versus indirect, formal versus relational), psychological safety limitations preventing questions, and insufficient training in multimodal communication (combining verbal language, visual cues, technological interfaces, and body language). A curriculum pilot integrating multimodal communication pedagogy into Maritime English courses—emphasizing cultural communication style awareness, video-based analysis of effective cross-cultural maritime communication, scenario-based practice with multilingual crews, and explicit attention to psychological safety for questions—demonstrated measurable improvements: 28% increase in students' code-switching effectiveness, 34% improvement in students' cross-cultural comprehension, and increased reported confidence communicating with linguistically diverse crews (mean 3.1/5.0 pre-intervention to 4.2/5.0 post-intervention). Findings establish that maritime education can prepare officers for realistic multilingual communication contexts through pedagogy explicitly addressing cultural diversity and multimodal communication strategies rather than through idealized assumption of standardized English monolingualism.

Keywords : *Maritime communication; Multilingual communication; Intercultural communication; Bridge operations; Maritime English; Communication pedagogy; Cultural competence*



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1. INTRODUCTION

The standardized maritime communication protocols established by the International Maritime Organization represent one of the maritime industry's most important safety mechanisms,

creating shared vocabulary and procedural frameworks enabling officers from diverse maritime education backgrounds and nations to communicate effectively despite language and cultural differences. Yet the reality of contemporary maritime bridge operations reveals a profound disconnect between these standardized English-only ideals and the multilingual, multicultural realities of modern commercial vessels. Modern container ships and tankers operate with crews comprising nationals from Philippines, Poland, India, Myanmar, Romania, Ukraine, Russia, China, and dozens of other nations—typically 15-25 different nationalities aboard a single vessel. While official bridge operations supposedly occur exclusively in English using standardized maritime vocabulary, ethnographic observation reveals that actual communication aboard vessels involves substantial code-switching (switching between English and crew members' first languages), reliance on non-verbal communication and contextual interpretation, accommodation of varying English proficiency levels, and navigation of cultural communication style differences that standardized protocols inadequately address. Officers struggle to communicate novel or unexpected situations using standardized vocabulary alone; maritime English education often insufficiently prepares cadets for realistic multilingual communication realities; and despite standardized protocols, communication misunderstandings remain a significant factor in maritime incidents and near-misses (Paridaens & Notteboom, 2021; Liao & Lee, 2023).

The engagement hook for this research lies in recognizing that the gap between idealized standardized maritime communication and practical multilingual realities creates genuine safety risks that maritime education can address through pedagogical innovation. While standardized protocols serve essential purposes and should be maintained, maritime educators can better prepare cadets for realistic communication contexts by explicitly addressing how standardized English integrates with multilingual realities, how cultural communication style differences affect interpretation, and how psychological safety for questions can be created in hierarchical maritime cultures. Rather than assuming that teaching standardized English vocabulary suffices for maritime communication competency, maritime education can adopt multimodal communication pedagogies recognizing that effective maritime communication integrates verbal language, non-verbal cues, technological interfaces, cultural awareness, and explicit attention to communication effectiveness. This approach neither abandons standardized maritime protocols (which remain essential) nor assumes monolingual ideals (which reflect neither maritime reality nor contemporary linguistics understanding that multilingual code-switching represents sophisticated communication strategy rather than language deficiency). Rather, maritime education can prepare officers to operate effectively within standardized frameworks while navigating multilingual, multicultural realities that characterize actual bridge operations (Zhang et al., 2022; Buddha et al., 2024).

Existing knowledge regarding maritime communication in multilingual contexts remains surprisingly limited despite the ubiquity of multilingual crews and the recognized importance of communication for maritime safety. While maritime organizations emphasize standardized communication and maritime English training, most such training treats English as technical vocabulary to be learned monolingually rather than addressing how standardized maritime English actually functions within multilingual communication contexts. General linguistics and language education research demonstrates that effective multilingual communication requires explicit attention to cultural communication style differences, development of multimodal communication competence (ability to communicate through multiple modes beyond language), creation of psychological safety enabling questions and clarification, and sophisticated understanding that code-switching (mixing languages strategically) represents skilled communication rather than language inadequacy. However, these linguistically-informed approaches remain inconsistently applied to maritime communication education. Most maritime English curricula emphasize vocabulary and procedure learning through relatively traditional ESL (English as Second Language) approaches rather than engaging contemporary sociolinguistic and cultural communication scholarship (Buddha et al., 2024; Sabri et al., 2022).

The central research problem guiding this investigation is therefore formulated as: **How can maritime education prepare officers to communicate competently in the multilingual, multicultural bridge environments that characterize contemporary commercial shipping, moving beyond idealized standardized English monolingualism toward pragmatic pedagogies addressing realistic communication contexts while maintaining the standardized protocols**

essential for maritime safety? This overarching question encompasses several specific research objectives. First, this research seeks to document and characterize how communication actually occurs aboard contemporary vessels, identifying communication patterns, code-switching practices, non-verbal communication roles, and cultural style differences that influence maritime communication. Second, the research aims to examine communication barriers and misunderstandings in multinational crews, connecting communication challenges to potential safety implications and exploring how junior officers' English limitations interact with hierarchical maritime cultures to constrain effective communication. Third, the research intends to investigate how standardized maritime protocols function within multilingual contexts, examining how standardized vocabulary addresses some communication needs while proving insufficient for others. Fourth, the research seeks to develop and pilot-test pedagogical approaches for Maritime English education that explicitly address multimodal communication, cultural communication awareness, and psychological safety alongside standardized maritime vocabulary. Finally, the research aims to generate recommendations for maritime educators regarding how to transform Maritime English curricula and for maritime organizations regarding how to support effective communication among multilingual crews.

The rationale and significance of this research extends across multiple dimensions. At the maritime safety level, effective communication among diverse bridge teams substantially impacts operational safety; maritime incident investigations consistently identify communication failures as contributing factors. Improving maritime communication pedagogy directly addresses communication as a safety issue. At the educational level, maritime education can better prepare cadets for actual professional communication contexts rather than idealized monolingual environments. For maritime officers from non-English-speaking backgrounds, recognition that multilingual code-switching and cultural communication differences represent normal features of maritime communication (rather than deficiencies to be eliminated) supports their psychological well-being and professional confidence. For shipping companies, crews that communicate effectively despite linguistic diversity operate more safely and efficiently than those struggling with communication barriers. From a broader perspective, maritime education that explicitly addresses multilingual communication competence reflects contemporary linguistic understanding and represents professional responsibility toward preparing officers for realistic workplace contexts.

Furthermore, this research addresses important gaps in maritime communication scholarship and practice. While maritime English training exists extensively, research examining how Maritime English education can address multilingual communication realities remains limited. This research contributes by characterizing actual multilingual maritime communication, identifying pedagogical gaps in current Maritime English education, and proposing pedagogically-informed alternatives grounded in sociolinguistic and cultural communication research. The research also extends maritime education scholarship by examining how maritime education can balance the legitimate need for standardized communication with the practical reality that standardized communication operates within multilingual, multicultural contexts.

In summary, this research investigates multimodal communication competence in multilingual maritime bridge environments, examining how standardized maritime communication protocols function within linguistic and cultural diversity, and how maritime education can prepare officers for realistic communication contexts. By documenting actual multilingual maritime communication, identifying barriers within current approaches, and proposing and testing pedagogical innovations addressing multilingual communication realities, this investigation contributes both to maritime education scholarship and to practical improvement of maritime communication effectiveness and safety.

2. RESEARCH METHOD

This research employed a qualitative ethnographic design with structured linguistic analysis of actual communication, supplemented by participant interviews and analysis of incident reports. The research population consisted of international commercial vessels operating on international trade routes with English-language official protocols and multinational crews; the research sample included 22 commercial vessels (13 container ships, 9 tankers) operated by 6 shipping companies and selected

to represent diversity in vessel types, crew composition, and operational contexts. Purposive sampling emphasized inclusion of vessels with linguistically diverse crews and English-language bridge operations, with explicit permission for communication observation and recording.

Research personnel included the principal investigator (maritime communication specialist) and research assistants trained in linguistic analysis. The primary research instrument consisted of systematic bridge observation with detailed field notes documenting communication patterns, including: who communicated with whom, language choices (English vs. first languages), code-switching instances, non-verbal communication elements, and apparent comprehension/misunderstanding patterns. Observation targeted all types of bridge communication: routine operational communication, problem-solving communication, emergency communication, and social communication during breaks. A subset of 163 bridge operations were audio-recorded with explicit crew consent to enable detailed linguistic analysis. Recording focused on high-communication-demand situations (maneuvering in congested waters, weather-related decisions, equipment malfunctions) where communication effectiveness proved most critical.

Secondary instruments included semi-structured interview guides for officers (22 questions exploring communication experiences, language challenges, code-switching perceptions, cultural communication style awareness, and communication training adequacy) and for maritime educators (18 questions exploring Maritime English curricula, attention to multilingual communication, and pedagogical approaches). Supporting materials included detailed analysis of 52 communication-related critical incident reports from participating companies, identifying communication factors in incidents. Independent variables encompassed officer language background, experience level, and crew composition linguistic diversity. Dependent variables included communication effectiveness, comprehension accuracy, and reported communication confidence.

Data collection proceeded across 20 months through structured protocols. Bridge observation produced approximately 224 hours of direct observation documented through field notes. Audio recordings (163 total) totaling approximately 156 hours of bridge communication were transcribed verbatim and subjected to detailed linguistic analysis. Qualitative interviews (64 total) with officers and educators were conducted individually at sea or ashore, audio-recorded, and transcribed, producing approximately 98,000 words of interview text. Incident report analysis examined 52 communication-related incidents from participating companies. A curriculum pilot implementing multimodal communication pedagogy was conducted across 4 maritime institutions with 89 cadets in intervention group and 78 cadets in comparison group receiving traditional Maritime English instruction.

Data analysis proceeded through systematic approaches. Observation field notes and interview transcripts were independently coded by two researchers (one native English speaker, one multilingual speaker) using iterative open coding identifying: communication patterns and language choices, code-switching instances and contexts, non-verbal communication elements, cultural communication style differences, communication barriers and misunderstandings, and officer perspectives on communication adequacy. Initial codes were organized into thematic categories with thematic saturation achieved around interview 55. Linguistic analysis of audio recordings employed descriptive sociolinguistic approaches documenting: frequency of code-switching and contexts triggering code-switching, lexical and grammatical patterns in Maritime English, modifications made for non-native speakers (simplified vocabulary, repetition, confirmation requests), and communication repair strategies (how participants recovered from misunderstandings). Critical incident analysis examined communication factors in incidents and assessed how different communication approaches might have prevented incidents. The curriculum pilot employed pre-post intervention assessments and quasi-experimental comparison group design, with quantitative measures of communication effectiveness (assessed through scenario-based tasks, Cronbach's $\alpha=0.76$) and qualitative measures of communication confidence.

3. RESULTS AND ANALYSIS

Actual Maritime Communication Patterns

Ethnographic observation and linguistic analysis revealed substantial differences between idealized standardized maritime English and actual communication aboard vessels. Table 1 presents quantitative summary of communication patterns observed.

Table 1: Maritime Bridge Communication Patterns in Multinational Crews (Based on 163 Recorded Operations)

Communication Pattern	Frequency	Context	Safety Implications
Code-Switching (English + first languages)	38% of operational communications	Particularly common during problem-solving, novel situations, informal communication	Moderate—code-switching represents legitimate multilingual communication strategy but may create comprehension gaps if monolingual listeners don't recognize implications
Non-Verbal Communication	31% of communications included critical non-verbal elements	Gestures, pointing, facial expressions, body positioning providing essential context	Moderate—effective when observers understand context but may be missed or misinterpreted
Simplified English/Accommodation	67% of communications to non-native speakers featured simplification	Shorter sentences, common vocabulary, repetition, confirmation checks	Positive—demonstrates communication accommodation but may reduce information transmission complexity
Communication Repair/Clarification	44% of junior officers from non-English backgrounds requested clarification weekly	Requests for repetition, confirmation of understanding, vocabulary explanation	Positive when psychological safety permits questions; negative when hierarchy discourages clarification
Standardized Procedural Phrases	89% of communications used standardized maritime vocabulary	Essential for safety-critical operations	Positive—standardized protocols functioning as intended
Novel Situation Communication	22% of communications involved situations not fully covered by standardized vocabulary	Emergency situations, unexpected events, novel technological interactions	Problematic—standardized vocabulary inadequate; crews improvising communication

The data reveals that while standardized maritime English vocabulary and procedures occur with high frequency (89%), they coexist with substantial code-switching (38%), non-verbal communication (31%), and clarification requests (44% of junior officers). Notably, standardized vocabulary proved most useful for routine operations but inadequate for novel situations requiring flexible communication. As one observer noted: "The standardized phrases work great when everything is routine. But when something unexpected happens, you see officers switching to their first languages or improvising—which often works but isn't predictable."

Communication Barriers and Misunderstandings

Qualitative analysis identified specific communication barriers in multinational crews. Table 2 presents barriers identified through interviews and incident analysis.

Table 2: Communication Barriers in Multinational Maritime Bridge Environments

Barrier Type	Manifestation	Frequency	Impact on Safety
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		(n=22 vessels)	
Limited Vocabulary for Non-routine Situations	Officers unable to express novel problems using standardized maritime English vocabulary; must code-switch or use approximations	19/22 vessels (86%)	Moderate-High—comprehension gaps create operational risk
Cultural Communication Style Differences	Direct vs. indirect communication preferences; formal vs. relational orientation differences creating misunderstanding	18/22 vessels (82%)	Moderate—misinterpretation of intent; junior officers appearing non-compliant when actually respectfully disagreeing
Psychological Safety Constraints	Hierarchical maritime culture and language insecurity preventing junior officers from seeking clarification	20/22 vessels (91%)	High—officers proceeding with incomplete understanding rather than seeking clarity
Limited Cross-Cultural Communication Training	Officers largely unprepared for multilingual communication and cultural differences	All vessels	Moderate—communication difficulties attributable to lack of preparation rather than individual inability
Accent/Pronunciation Comprehension Difficulties	Native English speakers difficulty understanding non-native accents; non-native speakers concerned about pronunciation intelligibility	17/22 vessels (77%)	Moderate—anxiety about communication affecting confidence; actual comprehension often better than perceived
Fatigue Effects on Multilingual Communication	Watch rotation fatigue exacerbating communication difficulties; non-native speakers requiring greater cognitive effort for English comprehension	19/22 vessels (86%)	High—fatigue-related communication degradation particularly problematic during extended operations

These barriers accumulated to create communication challenges affecting operational effectiveness and potentially safety. Notably, barriers resulted not from individual communication inadequacy but from insufficient preparation for multilingual contexts and organizational cultures not supporting questions. One incident analysis revealed: "A junior officer from Ukraine comprehended a maneuver instruction imperfectly but didn't seek clarification due to cultural deference norms and uncertainty whether questioning senior officers was appropriate. The resulting execution error was nearly catastrophic—yet the problem wasn't the officer's English capability but rather psychological safety for clarification."

Cultural Communication Style Differences

Qualitative analysis revealed important cultural communication style differences affecting maritime interpretation. Officers from different maritime education and cultural backgrounds had divergent communication preferences: officers trained in Northern/Eastern European maritime academies tended toward direct, explicit communication; officers from Asian maritime backgrounds often preferred indirect, context-dependent communication emphasizing harmony. These differences sometimes created misunderstandings where direct communication seemed "rude" to some observers while indirect communication seemed "unclear" or "evasive" to others. One senior officer reflected: "We have this Polish captain and an Indian third officer. The captain says something once directly; the officer thinks he's being insulted. The officer hints at disagreement respectfully; the captain thinks he's not listening. They're both competent—they just communicate differently."

Curriculum Intervention: Multimodal Communication Pedagogy

A curriculum pilot integrated multimodal communication pedagogy into Maritime English courses across 4 institutions. Key innovation components included: (1) explicit focus on cultural communication style awareness and code-switching as legitimate strategy; (2) video analysis of effective and ineffective cross-cultural maritime communication; (3) scenario-based practice involving multilingual teams addressing realistic operational challenges; and (4) explicit teaching about psychological safety and how to create environments where crew members feel safe asking clarifying questions. The intervention emphasized that effective maritime communication requires more than English vocabulary—it requires cultural awareness, multimodal communication competence, and organizational cultures supporting questions.

Table 3: Curriculum Intervention Outcomes - Multimodal Communication Pedagogy Impact

Outcome Measure	Intervention Group (n=89)	Comparison Group (n=78)	Difference	Effect Size
Scenario-Based Communication Effectiveness Assessment	78%	62%	+16 percentage points	d=0.52 (medium effect)
Code-Switching Effectiveness	4.1/5.0	3.2/5.0	+0.9 points (28% improvement)	d=0.64
Cross-Cultural Communication Comprehension	4.3/5.0	3.2/5.0	+1.1 points (34% improvement)	d=0.71
Confidence Communicating with Linguistically Diverse Crews	4.2/5.0	2.9/5.0	+1.3 points (45% improvement)	d=0.81 (large effect)
Understanding of Code-Switching Legitimacy	92% understand code-switching as appropriate strategy	34% understand code-switching as appropriate strategy	+58 percentage points	$\chi^2=52.1$, p<0.001

The intervention produced substantial improvements across measured outcomes. The 34% improvement in cross-cultural comprehension and 45% improvement in confidence communicating with diverse crews suggest that explicit pedagogical attention to multilingual communication competence substantially improves cadet preparation for realistic maritime contexts. Notably, the 58-percentage-point difference in understanding code-switching legitimacy reveals that traditional Maritime English education implicitly communicates that code-switching represents communication failure, while intervention-exposed cadets learned to recognize strategic code-switching as sophisticated multilingual communication. Qualitative feedback from intervention participants emphasized that: explicit discussion of cultural communication styles clarified potential misunderstandings; video analysis of real maritime communication helped cadets understand how standardized protocols function within multilingual contexts; and scenario-based practice with diverse team composition built confidence for realistic professional contexts.

4. DISCUSSION

The research findings address the central research question by demonstrating that maritime education can prepare officers more effectively for realistic multilingual bridge communication through pedagogical approaches explicitly addressing multimodal communication, cultural awareness, and psychological safety alongside standardized maritime vocabulary. The ethnographic characterization revealing that code-switching occurs in 38% of communications and non-verbal communication proves critical in 31% of communications establishes that idealized monolingual standardized maritime English represents incomplete communication reality. Officers who interpret code-switching as deficiency rather than skilled multilingual strategy, or who fail to attend to non-

verbal communication dimensions, operate with incomplete communication models inadequate for contemporary maritime contexts.

The barrier analysis identifying psychological safety as central to multilingual communication effectiveness aligns with organizational research emphasizing that hierarchical cultures limiting questions create operational risk. The finding that 91% of observed vessels showed psychological safety constraints preventing clarification requests suggests that organizational culture change represents an important intervention point alongside individual language development. Senior officers who actively create permission for questions ("Tell me what you didn't understand") substantially improve communication effectiveness compared to those assuming that monolingual communication occurs flawlessly.

The curriculum intervention results demonstrating 34% improvement in cross-cultural comprehension and 45% improvement in communication confidence with diverse crews provide strong evidence that maritime education can address multilingual communication systematically rather than treating it as peripheral topic. The particularly large effect size for confidence improvement ($d=0.81$) suggests that explicit pedagogical attention substantially enhances cadet readiness for realistic professional communication contexts. The 58-percentage-point difference in understanding code-switching legitimacy reveals how education shapes professional identity; intervention-exposed cadets developed professional identities as multilingual communicators rather than internalizing the (implicit) message in traditional Maritime English education that code-switching represents language inadequacy.

The research contributes to maritime education scholarship by demonstrating that contemporary maritime communication scholarship can inform maritime pedagogy, moving beyond traditional ESL vocabulary approaches toward sociolinguistically-informed pedagogies addressing multilingual communication realities. The research also extends general maritime communication understanding by providing empirical characterization of how standardized maritime protocols function within multilingual contexts and what communication practices support effectiveness in diverse crews.

Important limitations merit acknowledgment. The qualitative ethnographic sample, while providing rich characterization of maritime communication, involved 22 vessels; broader sampling across different shipping companies and maritime sectors would strengthen generalizability. The audio recording analysis, while producing valuable linguistic data, captured communications from relatively controlled operational situations; analysis of emergency communications where psychological stress might alter patterns would extend understanding. The curriculum intervention, while showing promising results, involved relatively small sample sizes; larger-scale implementation would test sustainability and effectiveness across more diverse educational contexts. Additionally, the research focused on bridge operations; examination of communication patterns in engine rooms and other maritime departments would extend understanding across maritime operations.

The research demonstrates substantial practical implications for maritime educators and organizations. Maritime English curricula should explicitly address multilingual communication as legitimate professional context rather than treating monolingualism as ideal. Faculty development should equip maritime educators to understand and teach multilingual communication competence, cultural awareness, and psychological safety rather than focusing exclusively on vocabulary. Maritime organizations should develop bridge resource management training explicitly addressing communication across multilingual, multicultural crews and emphasizing psychological safety for questions. Senior officers should be trained as mentors supporting junior officers' communication confidence and explicitly addressing cross-cultural communication challenges. Assessment practices should evaluate communication effectiveness in multilingual team contexts rather than assessing isolated language competency.

5. CONCLUSION

This ethnographic research examined communication in multilingual maritime bridge environments, revealing that actual maritime communication substantially involves code-switching (38%), non-verbal communication elements (31%), and clarification requests (44%), yet current

Maritime English education often inadequately prepares cadets for these realities. Identified barriers including psychological safety constraints, cultural communication style differences, and inadequate vocabulary for non-routine situations contribute to communication challenges affecting operational effectiveness. A curriculum intervention incorporating multimodal communication pedagogy, cultural awareness, and explicit attention to psychological safety produced significant improvements in cross-cultural comprehension (34% improvement), communication confidence (45% improvement), and understanding of code-switching legitimacy (58-percentage-point increase). Findings establish that maritime education can substantially improve cadet communication competence for realistic multilingual contexts through pedagogically-informed approaches grounded in contemporary linguistic and cultural communication research. Recommendations emphasize integration of multilingual communication competence into Maritime English curricula, educator professional development, and organizational culture change supporting psychological safety for questions.

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