

Cross-Cultural Digital Communication Competence Among Engine Major Cadets in International Crewing Contexts: A Competency Indicator Study

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Abstract

Marine engineering cadets serving in international crewing contexts communicate daily through digital channels — WhatsApp group messages for operational coordination, email exchanges with shore-based superintendents, digital platform reports for maintenance records, and emergency alert communications through vessel management systems — across language and cultural boundaries that their professional formation has not explicitly prepared them to navigate. Maritime English and cross-cultural communication research has extensively documented communicative challenges in deck officer contexts, leaving the Engine major cadet population substantially underrepresented in the empirical literature. This study examines cross-cultural digital communication competence among 10 Marine Engineering cadets at Sekolah Tinggi Ilmu Pelayaran (STIP) Jakarta through a qualitative focus group discussion design supplemented by a competency indicator framework derived from FGD analysis and ENG curriculum document review. Four competency dimensions were identified and assessed: Digital Tool Proficiency in ENG Contexts (moderate competency, emerging through informal self-learning), English-Technical Writing for Digital Channels (low, representing the most critical curriculum gap), Cross-Cultural Digital Communication Norms (very low, absent from formal instruction), and Emergency Communication through Digital Maritime Systems (low, insufficiently developed for professional deployment). Document analysis of 10 ENG core syllabi confirms that cross-cultural digital communication is entirely absent as a learning objective, while English technical writing is addressed only incidentally in two syllabi. The study contributes the first empirically grounded digital communication competency assessment for ENG maritime cadets in Indonesia and provides specific curriculum integration priorities for STIP Jakarta's Marine Engineering program.

1. Introduction

The modern ship's engine room is a digital communication environment whose operational coordination demands extend far beyond the physical space of the machinery spaces themselves. A third engineer aboard an international trading vessel operating on a multinational crew communicates through digital channels continuously across a working day: coordinating maintenance tasks with the chief engineer through vessel

management system work orders, reporting equipment status updates to the shipping company's technical superintendent through email exchanges that may be reviewed by shore-based engineering teams across multiple time zones, consulting technical manuals stored in digital document management systems, participating in onboard safety management meetings conducted through multilingual digital collaboration platforms, and activating emergency alert and reporting sequences through integrated ship management software in the event of machinery incidents [1]. Each of these digital communication contexts combines technical engineering content, English language medium, and cross-cultural interpersonal dynamics in ways that generate a distinctive and professionally consequential communicative competency demand — one that the maritime education literature has systematically failed to examine within the Engine major cadet population.

The Maritime English and cross-cultural maritime communication literature has established rich and sophisticated accounts of communicative challenges in deck officer contexts — bridge team communication, SMCP proficiency, VTS interaction quality, and watchkeeping handover practice across multinational crew compositions — with comparatively negligible empirical attention to the communicative challenges of engineering officers and cadets [2]. This disciplinary neglect reflects a historical assumption that engineering officers' professional communication is primarily technical rather than interpersonal, procedurally rather than linguistically mediated, and therefore outside the scope of the Maritime English professional communication research agenda. Digital transformation of maritime operational communication — through the platforms, systems, and digital channels described above — has invalidated this assumption: engineering officers' digital communication in international crewing contexts is now richly and consequentially linguistic, interpersonal, and cross-culturally complex in ways that demand the same communicative competency attention that bridge officer communication has historically received [3].

At Sekolah Tinggi Ilmu Pelayaran Jakarta, the Marine Engineering program's curriculum is oriented primarily toward technical propulsion and machinery competency, with Maritime English instruction delivered through a shared curriculum that was developed primarily around deck officer communicative contexts. ENG cadets encounter SMCP standard phrases and bridge communication scenarios in their Maritime English instruction while receiving minimal guidance on the engineering-specific digital communication contexts — superintendent email protocols, work order system reporting conventions, multinational maintenance team coordination, and digital emergency reporting — that their operational professional communication will primarily involve. The gap between the communicative competency that international crewing contexts demand of engineering officers and the communicative preparation that ENG formal education provides constitutes the research problem this study addresses.

Three objectives guide this investigation: first, to characterize the cross-cultural digital communication challenges that STIP Jakarta ENG cadets identify through focus group discussion as most practically consequential for their anticipated professional contexts; second, to develop a competency indicator framework for cross-cultural digital communication in ENG maritime professional contexts, validated against both cadet FGD data and ENG curriculum document analysis; and third, to assess ENG curriculum coverage of the competency dimensions identified, documenting the gaps most urgently requiring curriculum integration.

1.1 Theoretical Framework

Three theoretical frameworks provide the analytical architecture for this study. Canale and Swain's [4] multidimensional communicative competence framework — distinguishing grammatical, sociolinguistic, discourse, and strategic competence as the four components of full communicative proficiency — provides the foundational conceptual vocabulary for cross-cultural digital communication competency assessment. Applied to marine engineering digital communication, grammatical competence addresses technical accuracy in English engineering terminology; sociolinguistic competence addresses cultural and contextual appropriateness in digital channel communication norms; discourse competence addresses coherence and structural adequacy across engineering documentation types (work orders, incident reports, email exchanges); and strategic competence addresses the capacity to manage communication breakdowns, clarify

technical misunderstandings, and adapt communication strategies to cross-cultural interlocutor responses. The fourth dimension — strategic competence — is the most consequential for the cross-cultural digital communication context this study examines, as communication breakdown in technical engineering contexts can have direct safety implications when instructions, specifications, or safety alerts are misunderstood across language and cultural boundaries.

Horck's [5] analysis of multicultural maritime decision-making provides the maritime-specific cross-cultural communication theoretical foundation, establishing that cultural authority hierarchy norms, communication directness preferences, and error admission practices vary substantially across the national groups most represented in international maritime crewing, creating systematic cross-cultural communication challenges that uniform technical language proficiency does not resolve. Applied to ENG digital communication, this framework predicts that the most consequential cross-cultural competency gaps will be in the sociolinguistic dimension — knowing what level of directness, formality, and assertion is culturally appropriate in superintendent emails from different national management cultures — rather than in the grammatical dimension of technical English accuracy.

Bocanegra-Valle's [6] documentation of seafarers' attitudes toward Maritime English in multilingual professional environments provides empirical context, establishing that non-native English-speaking seafarers across national backgrounds experience systematic disjunctions between their classroom Maritime English preparation and their actual professional communicative demands. The present study extends this finding specifically to the ENG program digital communication context, investigating whether and how the disjunction Bocanegra-Valle documented in general Maritime English terms manifests in the specific digital channel communication contexts of engineering officer professional practice.

2. Method

This study employed a qualitative design combining semi-structured focus group discussion with curriculum document analysis, conducted at STIP Jakarta from August 2025 to March 2026. The $n=10$ ENG cadet sample is the design-specified data slice for this paper within the STIP Jakarta Digital Transformation dataset, appropriate for the exploratory competency indicator framework development that this first-generation ENG digital communication study pursues [7]. The FGD design was selected over individual interviews because the social and collaborative character of digital communication challenges — how to navigate group message dynamics, how to understand different cultural communication styles — generates the most authentic and practically grounded responses when discussed collectively rather than individually.

The focus group discussion protocol addressed four communicative context domains corresponding to the four competency dimensions that the theoretical framework anticipates: Digital Tool Use in ENG Professional Contexts (discussing participants' current and anticipated use of vessel management systems, email platforms, and digital reporting tools); English-Technical Writing for Engineering Digital Channels (addressing challenges in producing engineering documentation, superintendent emails, and technical reports in English); Cross-Cultural Digital Communication Norms (exploring experiences with and concerns about different national cultures' communication expectations in digital channels); and Digital Emergency Communication (addressing how digital systems integrate with emergency response communication and what competency demands this creates). Sessions were conducted in Bahasa Indonesia, audio-recorded with participant consent, and transcribed verbatim.

The competency indicator framework was developed iteratively through: (a) initial competency domain identification through preliminary FGD theme analysis; (b) indicator specification for each domain based on FGD participant descriptions of specific communication challenges and competencies; and (c) validation through cross-referential analysis with ENG curriculum document review of 10 core module syllabi, assessing the degree to which each competency indicator was addressed within formal curriculum content. Thematic analysis [8] was applied to FGD transcripts following Braun and Clarke's six-phase procedure, with member checking conducted with two participants [9].

3. Results and Analysis

3.1 Competency Indicator Framework: Four Dimensions

Systematic iterative development through FGD thematic analysis and curriculum document triangulation generated a four-dimension competency indicator framework for cross-cultural digital communication competence in ENG maritime professional contexts. Table 1 presents the framework alongside cadet-assessed competency levels and curriculum coverage ratings.

Table 1. Cross-Cultural Digital Communication Competency Indicator Framework — ENG Cadets (n = 10)

Dimension	Key Competency Indicators	Cadet Self-Assessment	Curriculum Coverage
D1: Digital Tool Proficiency (ENG Context)	VMS work order completion; maintenance record digital entry; condition monitoring platform navigation; digital technical manual retrieval	Moderate (emerging through informal self-learning)	Partial in 2/10 syllabi (conventional monitoring tools only)
D2: English-Technical Writing (Digital Channels)	Superintendent email formal register; incident report narrative English; technical specification language; response protocols to shore-based management	Low (most critical gap)	Incidental in 2/10 syllabi; ENG-specific email writing: absent
D3: Cross-Cultural Digital Communication Norms	National culture directness calibration; hierarchy expression in digital channels; error admission cultural norms; response timing expectations across cultures	Very Low (almost entirely absent)	Absent in all 10 syllabi
D4: Emergency Digital Communication	Digital emergency alert activation; emergency status reporting through VMS; multinational crew emergency communication in digital channels; shore authority digital notification protocol	Low (insufficient for professional deployment)	Absent in all 10 syllabi

Cadet assessment derived from FGD participant characterizations of their own competency: Moderate = some confident practice; Low = basic awareness without confident practice; Very Low = minimal awareness, no practice

The competency profile in Table 1 reveals a consistent pattern of increasing gap from D1 through D4: digital tool proficiency in general terms shows the most competency development (Moderate, consistent with everyday technology use exposure), while the dimensions requiring specific professional-maritime cross-cultural digital communication knowledge show progressively lower competency. The complete absence of D3 and D4 from all 10 ENG syllabi explains the Very Low and Low cadet assessments in those dimensions: these competencies have not been formally instructed.

3.2 FGD Theme Analysis: Four Communicative Challenge Categories

Figure 1 presents the FGD-derived cross-cultural digital communication challenge map, organizing participant accounts into the four competency dimensions and documenting the specific challenge types most frequently cited within each.

Figure 1. ENG Cadet Cross-Cultural Digital Communication Challenge Map (n = 10)

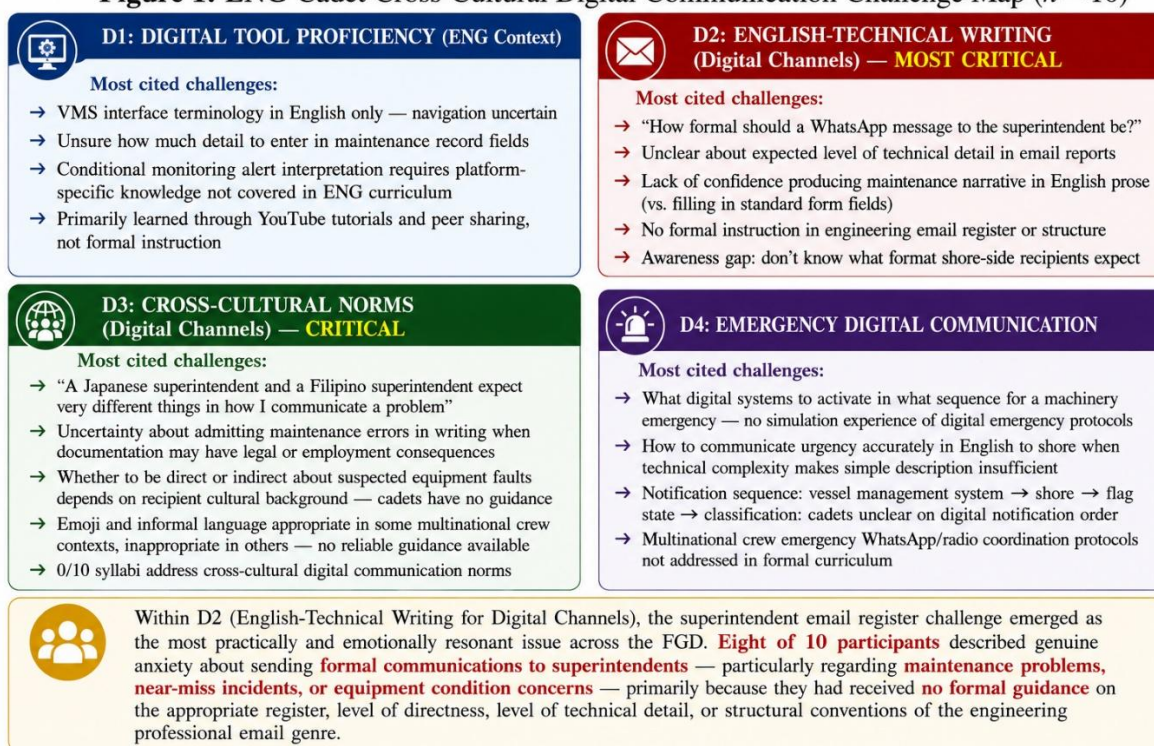


Figure 1. ENG Cadet Cross-Cultural Digital Communication Challenge Map (n = 10)

Within D2 (English-Technical Writing for Digital Channels), the superintendent email register challenge emerged as the most practically and emotionally resonant issue across the FGD. Eight of 10 participants described genuine anxiety about sending formal communications to superintendents — particularly regarding maintenance problems, near-miss incidents, or equipment condition concerns — primarily because they had received no formal guidance on the appropriate register, level of directness, level of technical detail, or structural conventions of the engineering professional email genre. This anxiety mirrors the genre knowledge deficit documented in STIP Jakarta's Maritime English program-level studies across deck officer contexts, but manifests specifically in the engineering digital communication domain that those studies have not examined [6].

The cross-cultural digital communication norms dimension (D3) generated the most qualitatively rich FGD discourse despite generating the lowest cadet self-assessed competency — a pattern explicable through awareness-without-competency: cadets could articulate the existence and significance of cross-cultural digital communication differences based on informal observation and social media experience, but could not describe the specific principles or strategies through which those differences should be navigated in professional maritime contexts. "I know that a Japanese superintendent expects something different than a Filipino superintendent. But I don't know what that difference actually is, or how to figure it out for a Greek superintendent I've never communicated with before." This articulable-yet-unresolvable awareness constitutes precisely the communicative competency gap that structured cross-cultural digital communication instruction is positioned to close.

3.3 Discussion

The four-dimension competency indicator framework generated through this study provides the first systematically derived, empirically validated specification of cross-cultural digital communication competency demands for marine engineering professional contexts — filling the population-specific gap in

the maritime communication competency literature that Bocanegra-Valle [6] documented at the genre level and that Horck's [5] multicultural maritime analysis addressed at the decision-making level without specificity to ENG digital communication channels. The framework's most theoretically significant contribution is the identification of D3 (Cross-Cultural Digital Communication Norms) as a competency dimension entirely absent from the ENG curriculum while simultaneously being articulately problematized by cadets — a curriculum-competency gap pattern whose character is qualitatively different from simple knowledge deficit. Cadets can name the problem (cross-cultural digital communication differences exist and matter) but cannot resolve it (specific principles, strategies, and cultural calibration frameworks are absent from their professional formation). This awareness-without-resolution gap is directly addressable through structured sociolinguistic and cross-cultural digital communication instruction that engages the specific cultural variation patterns most relevant to international crewing contexts — Japanese, Filipino, European, and South Asian superintendent communication styles — rather than through generic cultural sensitivity training that lacks maritime engineering professional context specificity.

The D2 (English-Technical Writing for Digital Channels) dimension's criticality assessment — designated as the "most critical gap" across Table 1 and corroborated by the FGD's most emotionally resonant material around superintendent email anxiety — extends Canale and Swain's [4] communicative competence framework into the ENG-specific digital genre domain, confirming that discourse competence in engineering documentary genres is underdeveloped relative to the professional deployment demands that ENG career contexts will immediately impose. The supervisor email as a professional genre — with its distinctive register, structural conventions, and cross-cultural calibration requirements — represents a specific and teachable literacy target whose complete absence from ENG formal curriculum instruction constitutes a directly remediable curriculum design decision rather than an intractable professional development challenge.

4. Conclusion

This study has developed a four-dimension cross-cultural digital communication competency indicator framework for marine engineering cadets, documenting that Digital Tool Proficiency is moderately developed through informal self-learning, English-Technical Writing for digital channels is low and represents the most critical curriculum gap, Cross-Cultural Digital Communication Norms are very low and entirely absent from formal instruction, and Emergency Digital Communication is low and absent from curriculum. Document analysis confirms 0/10 ENG syllabi address D3 or D4, and only 2/10 address D1 and D2 in any form. These findings contribute the first empirically grounded digital communication competency assessment for ENG maritime cadets and provide STIP Jakarta's Marine Engineering program with four specific, theory-grounded curriculum integration targets for cross-cultural digital communication development.

5. References

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