Miscommunication in Maritime Contexts
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Nicole Ziegler
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Contents

Acronym List

AHP	Analytical Hierarchy Process	LCC	Linguistically Centered Concept
ATC	Air Traffic Control	ME	Maritime English
BRM	Bridge Resource Management	MEET	Maritime English Education and Training (China)
ESL	English as a Second Language	MET	Maritime English Training
ESP	English for Specific Purposes	SIRC	Seafarer's International Research Centre
FLCAS	Foreign Language Classroom Anxiety Scale	SLA	Second Language Acquisition
GMDSS	Global Maritime Distress and Safety System	SMCP	Standard Marine Communication Phrases
GME	General Maritime English	SME	Specialized Maritime English
HCFs	Human Causal Factors	SMNV	Standard Marine Navigational Vocabulary
IMLA	International Maritime Lecturers' Association	STCW	Standards of Training, Certification & Watchkeeping
IMO	International Maritime Organization	TBLT	Task-Based Language Teaching
KUP	Knowledge, Understanding, and Proficiency	VHF	Very High Frequency
L1	First Language	VTS	Vessel Traffic Service
L2	Second Language		

Abstract

Over the last 30 years, the modern maritime industry has experienced steady growth, with commercial shipping now accounting for up to 90% of world trade (SSR 2021). This increase in global shipping has led to the development of a labor market of mariners from a wide variety of cultural and linguistic backgrounds. Currently, nearly 90% of all the world's crews are multinational, with the common languages spoken on board unlikely to be the native language of the majority of crew (Fan et al., 2016). Although a variety of factors can affect the crew's ability to safely handle a vessel, human error has contributed to 80-85% of accidents (Acejo et al., 2018; Galieriková, 2019). Poor communication has been identified as a main contributing factor (Pyne & Koester, 2005; Sampson & Zhao, 2003; Trenkner, 2007; Ziarati, 2009), with communication issues between vessels often the primary cause of collisions (Uğurlu et al., 2015). The ability of seafarers from diverse backgrounds to communicate safely and effectively is a vital component of the commercial maritime industry and within this unique linguistic context, there is a distinct need for cost-effective, efficient language and cross-cultural training that successfully supports mariners' use of clear and concise communication in ship-to-ship, ship-to-shore, and onboard interactions. The current white paper aims to provide a comprehensive review of the literature exploring miscommunication in maritime contexts, with a specific focus on the linguistic, social, and cultural causes of miscommunication, as well as gaps in Maritime English (ME) teaching practices and training programs worldwide.

Introduction

Drawing on empirical and synthetic research, this paper will first provide a brief background on ME and past industry efforts to improve communication, followed by a discussion of how human error, language proficiency, and psychosocial factors impact communication. Then, after a review of ME teaching practices, including the efficacy of various pedagogical approaches and how these might be improved to better support learners' communicative abilities, this paper will examine the findings of a number of needs analyses of global maritime contexts. This will lead to a discussion of the challenges faced by ME instructors, including lack of clear, applicable guidelines for classroom practices, inadequate subject knowledge, and how the mismatches between learners' training and authentic, real-world communicative needs contribute to miscommunication at sea. Next, this paper will address the role native English speakers play in miscommunication due to a lack of training in standardized language resources and their attitudes and expectations of second language (L2) speaking seafarers. Then, the effects of cultural differences on interactions, including the impact of different cultural backgrounds and expectations on communication, particularly in terms of power hierarchies and politeness, will be explored. Finally, this white paper will provide some recommendations for further exploring and, importantly, addressing miscommunication in maritime contexts.

Maritime English and the Standard Marine Communication Phrases: Global Efforts to Improve Communication

Beginning with a brief historical review of efforts by the maritime industry to improve communication through standardization and simplified use of English as a lingua franca in commercial shipping, this section will provide a general overview of sources of miscommunication and continuing challenges in terms of reducing communication caused accidents and incidents.

In order to provide a common language and to reduce communication caused accidents, the Standard Marine Navigational Vocabulary (SMNV) was created in 1977, and later amended in 1985. Although the SMNV was a needed first step, it was not comprehensive enough to keep pace with the changing conditions in the modernization of seafaring and safety related verbal communication (Short, 2006). In response to these changing needs, ME, generally viewed as a simplified and highly technical version of English adapted for the specific use of seafarers, was included in the 1995 amendments to the Standards of Training, Certification & Watchkeeping (STCW 78/95) requirements maintained by the International Maritime Organization (IMO) to provide an operational language for watchkeepers of all linguistic backgrounds. The STCW requires watchkeepers, the qualified personnel responsible for the safe operation of the ship and all running machinery, to be able to use English in written and oral form at a proficiency level which will allow the reading and interpretation of navigational and meteorological information, as well as the use of the SMNV (STCW 78/95; Sampson & Zhao, 2003). Similar to many forms of English

for specific purposes (ESP), ME is grounded in the conventional structure, vocabulary, and interactional patterns of English, but also reflects the specialized needs of this unique context. Defined as the "the entirety of all those means of the English language which, being used as a device for communication within the international maritime community, contribute to the safety of navigation and the facilitation of the seaborne trade" (Trenker, 2000, p.7), ME refers to the use of English in ship-to-ship, ship-to-shore, and onboard communication (Jurkovič, 2015).

In addition to ME, the Standard Marine Communication Phrases (SMCP), a revised and expanded sequel to the SMNV, was instituted in 2001 by the IMO in an attempt to standardize maritime language use by providing non-native English mariners with linguistically simplified phrases (Schriever, 2008). The SMCP, which includes more than 3,000 phrases deemed essential for effective and safe communication practices at sea, is focused mainly on functional and technical aspects of ME. Addressing issues from distress to traffic navigation, the SMCP is intended to provide mariners with the essential reduced English phrases necessary for safe interactions in a variety of situations. Similar to the language of air traffic control because of its limited use in a restricted set of functions (Moder & Halleck, 2009), the SMCP is a prescriptive phraseology with reduced syntax and vocabulary for common and routine interactions.

In order to improve predictability and comprehension, the use of Message Markers (*Instruction, Advice, Warning, Information, Question, Answer, Request,* and *Intention,*) is also recommended by the IMO to precede the use of phrases from the SMCP in ship-to-ship and ship-to-shore communications. These markers are designed to provide direct guidance in terms of the speakers' intentions and the listeners' expectations of what is heard during ship-to-ship and ship-to-shore interactions. However, the use of Message Markers is not required and is open to the situational assessment and interpretation of individual seafarers. Thus, this optionality potentially contributes to communication failures caused by differences in expectations or pragmatic interpretations based on individual cultural or linguistic backgrounds.

Despite these efforts to address miscommunication, lack of training in the use of ME and the SMCP for both native and non-native English speaking mariners, as well as inadequate proficiency levels of L2 speakers, have continued to negatively impact verbal maritime interactions (as noted in Ziarati et al., 2009); so too has the disinclination of native English speakers to use the SMCP (Short, 2006). Many studies have demonstrated that misunderstandings and miscommunication are more likely to occur between interlocutors with different first languages (e.g., Mitroussi & Notteboom, 2014; Trenkner, 2007; Ziarati, 2006; Ziarati et al., 2011). In addition, a lack of linguistic proficiency as well as poor communicative competence, defined as learners' ability to use grammar (linguistic competence, Chomsky, 1959) as well as the ability to appropriately use language (Hymes, 1972), have been identified as leading contributors to miscommunication at sea. As Bocanegra-Valle (2011, 2012) has reported, a number of mariners seem to have insufficient

proficiency in terms of ME, potentially impacting safety, accidents, incidents, and environmental pollution. More recently, Oraith et al.'s (2021) systematic review of accident reports from 1995-2015 demonstrated that the rate of accidents is inversely correlated to L2 English proficiency in crew. In these and other studies, researchers have thus shown how inconsistent standardization in language and format for communication may also have contributed to communication failures (e.g., Short 2006.) Native speakers of English, moreover, can contribute to maritime miscommunication given that they do not consistently receive direct training in the use of standardized language, potentially causing reluctance to use standardized phraseologies, such as the SMCP (Short, 2006; Uchida & Takagi, 2012).

During the last two decades, various programs and frameworks have been developed to address miscommunication through direct training. As Ziarati et al. (2009) point out, there are no explicit requirements for English language proficiency. The MarTEL project (2007-2009), which Ziarati et al. (2009) define as a "maritime language competency assessment project," sought to address this issue by drawing on pedagogical approaches and proficiency standards from the field of English language instruction. More recently, the PraC-MARENG research project, which is a consortium of stakeholders partnering to "promote and emphasize the importance of English as the language of sea," (Acar & Varsami, 2021, p. 602), sought to identify common causes of miscommunication in order to develop an online course for seafarers to support the use of the SMCP. The PraC-MARENG project began with a survey, which was administered to 120 maritime stakeholders in Northern and Eastern Europe, and indicated that 95.8% of participants felt that their training could be improved through explicit support in terms of their rank and specific duties. In other words, most participants felt that their training did not accurately represent their real-world needs in terms of language use and proficiency (Acar & Varsami, 2021).

In addition, many communicative difficulties are a result of cultural and pragmatic differences as well as linguistic failures. Currently available materials, such as MARCOM, focus heavily on decontextualized linguistic grammar exercises, as opposed to developing the language needed for maritime tasks and interactions, potentially failing to provide learners with the linguistic resources to effectively communicate. Studies also demonstrate that communication issues have an impact on social interactions and team building on mixed nationality vessels, with multilingual crews experiencing isolation and alienation due to inadequate language skills. These social factors have been found to lead to negative effects on social harmony, teamwork on board, and an unwillingness to admit misunderstandings or communicative failures (e.g., Pauksztat, 2021; Squire, 2004; Sampson & Zhao, 2003; Short, 2006). These factors in turn are likely to contribute to tension and potential language problems, further complicating communication on board vessels (Sampson & Zhao, 2003). Furthermore, vessels with multinational crews have often reported severe communication problems when working together and completing job related tasks, with crews sometimes communicating solely through questionably effective hand signals and gestures (Short, 2006).

Human Error, Miscommunication, and Contributing Factors

In 1990, the Scandinavian Star caught fire due to arson, leading to 158 casualties. Many of the crew had little to no proficiency in English, Norwegian, or Danish, the common languages of the passengers on board. Although one of the Portuguese speaking crew members tried to report an arson attempt, his language proficiency was insufficient and he was unable to make himself understood (Robinson, 1999). As Schriever (2008) points out, language barriers and confusion among the crew were significant contributing factors to this accident, and later galvanized the IMO to amend the STCW in 1995 to require minimum English proficiency of all seafarers. This section will address the multifaceted ways in which human error and miscommunication have contributed to maritime accidents, highlighting how the linguistic and communicative competence of crew may contribute to cross-cultural misunderstandings. In addition, the cooperative and demanding nature of onboard environments, and how this may be impacted by linguistic and psychosocial factors, will be discussed.

Research during the past few decades has demonstrated that human error is the primary factor in maritime accidents (e.g., Chauvin et al., 2013; Hasanphahić et al., 2021; Ziarati et al., 2009), with studies demonstrating that communication problems have been found to cause most marine accidents (John et al., 2013; Mockel et al., 2014). Because of the high financial, environmental, and human cost to accidents and incidents at sea, with shipping serving as one of the most vital forms of transportation in the current global economy (Acar & Varsami, 2021), it is crucial to understand the contributing factors impacting these human-caused failures. A variety of studies have explored the underlying influences, with maritime experts and scholars suggesting that of the 80%-85% of accidents and incidents caused by human error, the majority are due to miscommunication or misunderstandings (e.g., Chauvin et al., 2013; Li et al, 2023; Qiao et al., 2020a, 2020b). For example, ship-to-ship communication has been identified as a critical factor in accidents, with decision errors and inadequate bridge communication playing a substantial role in accidents and incidents (Chauvin et al., 2013; Pourzanjani, 2001). Yıldırım et al. (2017) found that communication between ship-to-ship and communication between ship-to-Vessel Traffic Service (VTS) was the influencing factor in 26.10% of collisions and 4. 76% of groundings, while Acejo et al.'s (2018) analysis of 319 accident reports from North America, the United Kingdom, Australia, New Zealand, and parts of northern Europe demonstrated communication failures were the overall cause in 23.5% of accidents. Insufficient bridge team communication was also found to be the most common cause of groundings (Macrae, 2009), with most accidents occurring when the captain and officers or the captain/officer and lookout are present on the bridge. Recently, Hasanphahić et al. (2021) found that communication played a substantial role in human caused accidents, particularly in terms of miscommunication between officers and crew, lack of clear communication across bridge teams on multiple vessels, confusing communication between pilots and bridge teams, insufficient communication between ship-to-shore, and poor communication between bridge teams

and engineers. In addition, research suggests that despite the presence of pilots on board to avoid human caused errors (Uğurlu et al., 2015a, 2015b), these types of accidents are nonetheless increasing (GARD, 2014).

Findings also suggest that captains, deck officers, and pilots have been identified as a major contributing factor(s) in many of these accidents and incidents (Gill & Wahner, 2012), with 96.5% of these human errors occurring on the bridge (Graziano et al., 2016). For example, Uğurlu et al. (2015) found that communication failures, specifically faulty interpretations of directions and lack of communication during bridge resource management, was the primary cause of human error caused accidents. For instance, a significant factor in the collision of the cruise ship Nippon Maru with the mooring dolphin in Apra Harbor, Guam, was the use of Japanese rather than English for crew communication while the pilot was on board (NTSB, 2018). In this case, the master was found to be intoxicated, but refused to yield control of the vessel to the third officer. Although the third officer warned the master three times that the joystick was in the wrong position to execute the necessary maneuvers, these warnings were in Japanese. Thus, the pilot, who was not a Japanese speaker, was not able to understand the situation. In addition, most crew communication was in Japanese, further excluding the pilot from important information regarding the vessel's position and distance to the mooring dolphin. Similarly, the first language (L1) Spanish pilot on board the cruise ship Norwegian Epic failed to use English to communicate with the tugs assisting with docking in San Juan, thereby excluding the master from important information that may have helped to prevent the subsequent allision with the dock (NTSB, 2019). This accident illustrates how poor bridge resource management and communication impacted the information needed by the pilot to successfully complete procedures and avoid an accident.

More recently, Oraith et al.'s (2021) analysis of the contributing human factors on maritime pilot operations demonstrated the pivotal role played by communication – or rather, miscommunication– in terms of human causal factors (HCFs). This communication includes language barriers, as well as the misunderstandings that can result from a multicultural crew attempting to interact in a language in which they have limited proficiency. In other words, ME proficiency levels and cultural differences impact the efficacy of teamwork, cooperation, and cohesion of multilinguistic and multicultural crew (e.g., Brenker et al., 2017; Sampson & Zhao, 2003). Oraith et al.'s study (2021) identified 25 HCFs impacting maritime accidents during pilotage operations, with ten of these related to communication: lack of teamwork; lack of effective communication and language barriers; failure during the information exchange between pilot and master; failure to establish maneuvering plan prior to piloting; failure of pilot to provide clear instructions; failure of the ship's master to follow pilot instructions, including refusal, rejection, and wrongly interpreting directions; crews' failure to follow orders; failure of tug's masters to correctly follow pilot's instructions; relying on pilots without question during berthing; and using mobile phones during berthing. Following the analytical hierarchy process (AHP), which relies on experts to complete pair-wise comparisons and ranking of the identified HCFs, lack of effective

communication and language barriers accounted for 25.38% of human error caused accidents during pilotage, while failure to exchange information between the pilot and ship's master accounted for 24.87% of accidents. The third most critical factor contributing to 20.40% of accidents was identified as 'lack of teamwork,' which previous research has demonstrated can be negatively impacted by linguistic difficulties and cultural differences (e.g., Oldenburg et al., 2009; Sampson & Zhao, 2003).

These opportunities for miscommunication, as suggested above, may be exacerbated due to the different languages and cultures of seafarers, with research demonstrating that over 90% of vessels are manned by multilingual crews (Schriever, 2008; Trenkner, 2009), highlighting the potential for miscommunication due to lack of proficiency in ME, lack of cultural awareness and cross-cultural differences, and lack of pragmatic competence (e.g., Fei et al., 2009; Schriever, 2011), defined as the ability to situationally recognize and use language appropriately (Bachman & Palmer, 1996, 2010). Despite efforts to improve communication across the maritime industry, a large proportion of accidents and incidents are caused by communication errors and breakdowns (Ziarati et al., 2009), underscoring the importance of exploring the causes of these failures. For example, although communication caused accidents and incidents can be attributed to a wide variety of factors, findings indicate that inadequate language skills are one of the main causes in accidents at sea and in port (Ziarati, 2006; Pyne & Koester, 2005; Trenkner, 2007). Poor command of English was found to be responsible for up to 40% of collisions involving the human element and, although accidents at sea are decreasing overall, those due to human failure and miscommunication are increasing (Ziarati, 2006). Many aspects of the maritime industry require specialized skills and involve the use of highly specific, technical language, with communication often taking place in high risk and high stress environments. These factors can further aggravate learners' insufficient language proficiency (Gat & Keith, 1978; Shimizu et al., 2002) and contribute to communication breakdowns in a multicultural and multilinguistic context.

Mariners' limited language and communication skills may contribute to isolation and alienation in multilingual crews, as social interaction and communication play an important role in mitigating stressors associated with the highly stressful, risky, and challenging environment on board vessels (Oldenburg et al., 2009; Poyrazli et al., 2002; Zhang, 2016). Isolation, fatigue, social and occupational pressure, as well as loud and potentially physically uncomfortable environments are common (Oldenburg et al., 2009), with high turnover (up to 75-100% every 18 months in some areas) also impacting social cohesion and team-building (Mitroussi & Notteboom, 2014; Robert & Moulin, 2000). In addition, seafarers' inability to effectively communicate has been found to negatively impact social harmony, teamwork, the willingness of crew to admit misunderstandings or communicative failures, and the reporting and discussion of safety issues (Ek et al., 2014; Squire, 2004; Sampson & Zhao, 2003; Short, 2006). For example, the Seafarer's International Research Centre (SIRC) collected data via interviews from 242 mariners on board vessels, as well as crew managers and seafarers' families on shore. Insufficient

English proficiency was found to be connected to social isolation and loss of face in job related interactions. Results indicated that adequate communication, including general English skills as well as work-related terms and maritime vocabulary, between multinational crews was an integral part of safety aboard ships (SIRC, 2001). Similarly, Ćorović and Djurovic (2013) found that the onboard environment of living and working with personnel from multiple linguistic and cultural backgrounds could contribute to misunderstandings during operations, thereby negatively impacting crew performance and overall safety. More recently, Pauksztat (2021) demonstrated that as English proficiency increased, seafarers were more likely to discuss problems and make suggestions. Thus, language proficiency and communicative competence, as well as the intercultural understanding of the crew (Noble et al, 2011), play an important role in terms of the quality and cohesion of the onboard environment, which in turn, impacts numerous aspects of interaction and communication.

Furthermore, research suggests that communication is impacted by traditional occupational hierarchies (Fan et al., 2016), in which senior officers maintain a significant amount of power over more junior officers and other crew (Sampson & Zhao, 2003). For example, in their interviews with multinational crews, Sampson and Zhao (2003) found that power differentials contributed to potential misunderstandings and reduced crew interactions on board vessels. For instance, one crew member stated the following in terms of how miscommunication had damaged his relationship with the captain:

> "I try to put my point across, he doesn't quite understand and then he misunderstands what I am saying and comes back 'I'm Captain. You shut up.' And at that time I have to shut up. I don't want to be totally invisible and he doesn't understand English very well and he misunderstands a lot. Misunderstandings are bad. Regularly I have learned to shut up" (pp. 37).

These hierarchical power structures may be more influential for mariners with certain cultural beliefs, with research suggesting the seafarers from China may be particularly sensitive to saving face and adhering to hierarchies due to the collectivist nature of much of Chinese society (Kwek & Lee, 2015). Studies have also demonstrated that crew are often afraid of being held accountable for incidents or errors, and in communication poor environments exacerbated by hierarchical expectations, this may lead to seafarers' under-reporting of near-misses or problems, a chronic issue in the field overall (e.g., Hassel et al., 2011; Lappalainen et al., 2011). More recently, Oraith et al.'s (2021) analysis of pilotage operations highlighted the importance of teamwork and crew cohesion, with communication, cooperation, and coordination all playing a critical role in terms of facilitating and promoting effective and efficient team work.

Taken together, these studies demonstrate the need for improved language training and cultural awareness raising to mitigate the psychosocial aspects of poor communication, as these factors impact critical aspects of maritime environments, including teamwork, safety,

and crew cohesion, particularly in terms of bridge resource management (BRM). As Brenker et al. (2017) point out, although some courses have been developed to address these issues, their quality and efficacy has not yet been empirically measured, with some scholars suggesting such courses may reinforce existing biases or draw on broad oversimplifications (e.g., Kahveci et al., 2002; Knudsen & Froholdt, 2009). In order to better support mariners' cultural understanding, and thus potentially reduce the impact on both social and communicative misunderstandings, scholars have called for more direct training of seafarers to encourage open-mindedness and understanding (e.g., Wang & Gu, 2005). For example, Yıldırım et al. (2017) suggests that communication could be improved through training and drills, and by encouraging the master and crew to remain involved in decision making and control of the ship when a pilot is on board. According to Fan et al. (2017), despite cultural issues having been identified as a key source of misunderstandings and miscommunication, maritime students reported that they were most underprepared for intercultural understanding and communication during interactions at sea. Until cultural awareness raising is integrated more directly into training programs in a manner to combat stereotypes and preconceived biases (Brenker et al., 2017), seafarers are likely to continue to encounter social and linguistic issues related to this gap in their knowledge.

Addressing how these cultural, social, and linguistic factors impact communication is critical to promoting safety at sea, especially since Ziarati et al. (2009) suggest that the full extent to which miscommunication may impact maritime accidents and incidents may be underestimated, as owners and companies, as well as individual seafarers, often seek to mitigate their responsibility for accidents during the subsequent investigations. Apostol-Mates and Barbu (2015) state that

> "it is common knowledge that many shipping companies or ship owners do not take responsibility after an accident if language issues are marked out as the main cause…and even if language problems are not amongst the first causes…they are high-lighted as secondary cause or aggravating circumstances. The most important thing the shipping industry can do for its own sake is to employ trained seamen who have at least the abilities to understand English used in maritime environment if not the communication skills in Maritime English," (p. 543).

These findings further underscore the need to develop more effective training for mariners to support their development of linguistic, communicative, and intercultural competence. As Li et al. (2023) point out, exploring how to improve the efficacy and outcomes of ME instruction and training is "conducive to the realization of effective communication among seafarers or maritime practitioners, which is in turn conducive to the sustainable development and safety of the maritime industry" (p. 13).

Maritime English Teaching and Training: Challenges and Issues

Having established the important role of communication as a leading cause of maritime accidents, the following section provides an overview of current pedagogical approaches to improve learners' linguistic proficiency and communicative competence, thus reducing miscommunication. However, despite efforts by the IMO and International Maritime Lecturers' Association (IMLA) to support ME instruction, a number of challenges and issues related to miscommunication remain.

ESP can be defined as "the teaching and learning of English as a second or foreign language where the goal of the learners is to use English in a particular domain" (Paltridge & Starfield, 2014, pp. 23). ESP courses are often comprised of adult language learners with the same language learning goals, namely expertise in languages, skills, and genres related to their field. According to Čulić-Viskota & Kalebota (2013), ME meets the established characteristics of an ESP, such as being driven by the specific needs of learners, drawing on the duties and activities associated with the domain, and focusing on language, genres, and discourse related to these activities (Dudley-Evans & St. John, 1998). Following the recognition of English by the IMO General Assembly in 1977, in which English was accepted as "a common language for international communications between ships and between ships and shore services" (IMO, 1977; Valle, 2011), ME was later included in the 1995 amendments to the STCW 78/95 requirements maintained by the IMO to provide an operational language for watchkeepers of all linguistic backgrounds. The STCW requires watchkeepers, the qualified personnel responsible for the safe operation of the ship and all running machinery, to be able to use English in written and oral form at a proficiency level which will allow the reading and interpretation of navigational and meteorological information, as well as the use of the SMNV (STCW 78/95; Sampson & Zhao, 2003). ME involves a combination of specific registers that vary according to maritime field or subject matter, with distinct registers for nautical, technical, and commercial language, as well as variation across specific settings or backgrounds, such as navigation acts or reading maintenance manuals for the operation of vessel machinery (Cole et al., 2007). According to the IMO standards, mariners are also expected to have an understanding of general English vocabulary, grammar, and pronunciation, as this serves as the foundation for the more specific aspects of ME, including for navigation, radio communication, and the SMCP.

Following the recognition by the IMO in 1995 of ME as the lingua franca for communication at sea, various organizations and stakeholders have sought to develop and provide effective pedagogical practices to maritime universities and training programs to meet the language proficiency requirements of the STCW. However, as scholars have highlighted in previous research, the requirements can be vague or ambiguous (e.g., Ziarati et al., 2009). In addition, ME teaching practices have been criticized for the lack of instructional guidelines recognized by a governing or overseeing body, the disconnect between instructors' ability to teach English as a second language (ESL) and their knowledge of maritime subjects (or vice versa), outdated pedagogical practices that may fail to prepare students for communication and language use, and the siloing of researchers and institutions (e.g., Agustina, 2018; Ahmmed, 2020; Demydenko, 2012; James et al., 2018;

Khosiyono et al., 2019; Schriever, 2008). These issues have prompted a number of scholars to explore different approaches for efficiently and effectively providing instruction and support for the development of learners' ME. For example, Demydenko (2012) proposed a linguistically centered concept (LCC) to develop higher quality textbooks for first and second year English language learning maritime students. This proposal centers on a socio-functional approach, in which learners would have frequent opportunities to acquire language through real-life socialization. Demydenko (2012) suggests that such a model would start with carefully defined modules focused on functional general English, such as information about people or personal details, followed by general development of speaking, listening, reading, and writing through interaction and texts. This follows previous research in which scholars have highlighted the necessity of a baseline proficiency level for learners to be developmentally ready for ME (e.g., Cole & Trenkner, 2009; Mackey, 1999). Next, learners would then focus on ME specific language development, including interviews, maritime code words, defining and understanding parts of a ship, using the SMCP in emergency and non-emergency situations, and very high frequency (VHF) radio communication. Finally, assessment would draw on ME standards to evaluate learners' overall proficiency, mastery of content and scope. This approach places an emphasis on the development of functional English skills alongside learners' development of the more specialized and technical variety of ME. However, as Acar and Versami (2021) point out, there are varying international standards and expectations for ME proficiency due to the lack of a singular regulating body. Although the SMCP, the IMO's "Model Course 3.17, Maritime English," and the STCW Convention, which may be viewed as the "essential content" for ME (Acar & Versami, 2021, p. 603), are accepted by international maritime organizations as ME resources and guidelines, each country has its own rules and regulations concerning the teaching, evaluation, and certification of seafarers' ME proficiency. As Schriever (2008) and James et al. (2018) point out, teaching practices and curricula vary widely across educational contexts, with each country or institution responsible for evaluating mariners according to their own benchmarks in the absence of a standardized assessment or clearly defined proficiency requirement.

In 2015, the IMO's "Model Course 3.17, Maritime English" was updated to maintain the requirements for knowledge, understanding, and proficiency (KUP) as described in the recently amended STCW (2010). This course has been in use for decades to provide curricular and instructional guidance for maritime institutions and programs worldwide. This latest version of the course consists of General Maritime English (GME) and Specialized Maritime English (SME), striving to combine a genre-based ESP approach with the technical, highly specific language of ME. The GME is designed to promote learners' general skills development in terms of listening, speaking, reading, and writing, as well as facilitate gains in grammar, vocabulary, and phonology/pronunciation, and is non-domain specific. In addition, the GME is aimed at beginning and intermediate level learners. Similar to Demydenko's (2012) proposal, this component of the model course is designed to promote learners' functional language use. Once learners have improved their general proficiency, the focus shifts to SME, where learners are able to focus on the technical vocabulary and

language associated with various maritime domains. For example, Zhang and Cole (2018) highlight how the SME is designed to build communicative competence for navigation officers, engineering officers, electro-technical officers, Global Maritime Distress and Safety System (GMDSS) radio operators, and for personnel on passenger ships. Zhang and Cole (2018) also emphasize the importance of a genre-based approach to allow for ME to focus on "getting maritime-specific things done" (pp. 155), thus providing learners with opportunities to deepen their understanding of professional actions as well as the language needed in maritime communicative interactions. In addition, they reiterate the importance of integrating linguistic competence with communicative and cultural competence, thereby allowing learners to develop accuracy and structural knowledge as well as an understanding of how to use language in the cultural and socially complex context of maritime environments.

Building on this idea of a functional syllabus (in which a syllabus is designed around what leaners can do with language), rather than a structural syllabus (in which a syllabus or course is formed around the learning of grammatical structures), Agustina (2018) explored how task-based language teaching may provide important support for mariners' language learning and use in an Indonesian ME context. Taking a case-study approach, Agustina describes how collaborative teaching (Benesch, 1999), in which the ESP and Maritime subject instructors discussed and coordinated lessons together, helped to address the issue of ESP teachers' lack of subject specific knowledge (e.g., Iswati & Triastuti, 2021). Despite this cooperation, maritime instructional contexts in Indonesia nonetheless face issues with accessing proficiency appropriate maritime textbooks or coping with the common lack of maritime knowledge from language instructors.

Seeking to address these issues, Agustina (2018) argues for adopting task-based language teaching (TBLT), an evidence-based pedagogical approach in which learners engage in communicative, authentic real-life interactions, focusing on meaning rather than grammar or form. TBLT is designed to promote skills development through goal-oriented, meaningful, real-world language use using interactive tasks (e.g., Long, 2015; Skehan, 2003), with numerous empirical studies and syntheses (e.g., Chong & Reinders, 2020; Keck et al., 2006; Mackey & Goo, 2007; Ziegler, 2016) demonstrating its efficacy for second language learning and development. Agustina (2018) argues that TBLT aligns with the recent focus in ME courses on real-world skills and a growing interest in meaning making rather than solely grammar and vocabulary building. Ellis (2017) also suggests that explicit grammar instruction may be integrated successful into the task cycle, thereby providing learners with opportunities to focus on both meaning and form. Given that grammar may play a significant role in ensuring clear communication, particularly in terms of using the SMCP and VTS communication (Agustina, 2018), this approach may be well-suited to promoting learners' interactional and communicative as well as linguistic competence. In addition, a task-based approach may encourage the use of more authentic materials, such as accident or incident reports to facilitate reading comprehension (Kielbratowska, 2009) or interactional tasks centered on the master-pilot information exchange (Ziegler, 2022).

Although there has been encouragement and calls to action from individual scholars, as well as bodies such as the IMO and IMLA, to apply more communicative or interactional pedagogical approaches in the ME classroom, there remain a number of challenges. For example, China is hypothesized to train and produce the most seafarers in the global market (Wu & Winchester, 2005), with the Chinese fleet ranked second largest in tonnage in the world (UNCTAD, 2023). Given their share of the global market, the training practices experienced by Chinese seafarers have an important impact on overall communication at sea. According to Fan et al. (2017), the heavy focus on assessment forward teaching in Chinese maritime contexts constrains the interactional opportunities available for ME students in this context, negatively impacting learners' communicative abilities. The exam used in China, the Maritime English Education and Training (MEET), emphasizes domain specific subject knowledge rather than functional or practical use (Zhang et al., 2008). In addition, textbooks in Chinese maritime contexts are designed to prepare learners for the exam rather than for real-world language use, with classrooms offering few opportunities for learners to engage in authentic interactions (Fan et al., 2017). Furthermore, 90% of the ME instructors interviewed by Fan et al. (2017) felt that learners' communicative competence had decreased recently, with approximately 75% of class time focused on exam preparation rather than communication or skills to support language use. Students indicated that they found the teaching practices (66.18%) and testing-forward educational system (60.70%) to be unsatisfactory, with less than half of all students surveyed indicating satisfaction with their training. Both instructors and students felt that more authentic, real-world examples of language use, as well as more interactional opportunities, were necessary to better facilitate learners' communicative competence as lack of proficiency was considered a substantial issue (Fan et al., 2017; Kang et al., 2013; Tang et al., 2016). You (2012) also found that there were limited interactional opportunities for learners during their training, with learners' failing to develop competence in using English for daily life or contexts beyond the classroom, while James et al. (2018) highlight that most assessment practices are focused on reading, vocabulary, and grammar, with oral skills potentially not assessed or regularly taught. Although technology has recently been incorporated in an effort to improve interaction and feedback opportunities, the focus on exam preparation remains an obstacle to facilitating learners' communicative competence (Shi & Fan, 2021), with teaching practices in China continuing to follow more traditional approaches (Weng, 2015; Zhou et al., 2013).

Taken together, these findings demonstrate that future ME courses may need to be further adapted to more effectively facilitate L2 development, foster motivation and engagement, and support learners' communication skills through interaction and tasks rather than decontextualized exams or traditional forms of grammar-focused or translation-driven instruction. In other words, classroom instruction may need to be more firmly grounded in research-driven pedagogical approaches, such as TBLT. Adding support to previous research calling for more authentic materials (e.g., Ahmmed, 2018; James et al., 2018; Muirhead, 2004), these findings highlight how using situationally and interactionally

authentic task-based materials may improve learners' perceptions of relevance, thus promoting motivation, and facilitating learners' communicative competence by providing opportunities to focus on form and meaning.

Addressing the Gaps: Needs Analysis in Maritime English Contexts

The following section will review the findings of recent needs analyses that have been conducted to identify challenges and issues in Maritime English training (MET) programs in educational contexts worldwide. These findings provide important empirical evidence for the type of content and instructional approaches that may promote learners' linguistic and communicative competence as well as highlight continuing challenges experienced by instructors in MET programs, such as lack of resources and support.

The first step in creating a curriculum to support mariners' use of clear and efficient communication, particularly for a communicative, functional, or task-based syllabus, is to conduct a needs analysis to identify the *how* and *what* of the content that should be included in training for ME users. By providing up to date and relevant information regarding the authentic use of language in the commercial shipping industry, stakeholders will be better prepared to meet the linguistic and/or pragmatic needs of their students. According to Long (2005), most general language learning materials are unable to meet the specific needs of the learners they serve, failing to accurately target the necessary skills, genres, and registers needed for specific purposes. Because ME "involves a combination of distinctive registers according to the field or subject matter, hence its register complexity and medium" (Cole et al., 2007, pp. 136), a needs analysis is of particular importance in identifying the target tasks and skills to support learners' development of domain specific language. In addition, when considering real-world jobs and duties, these are often formulated in terms of tasks, highlighting the difference between the real-world use of linguistic items compared to the decontextualized structures and vocabulary in textbooks (Long, 2005). Drawing on various stakeholders and domain experts and using a diverse range of methods to aggregate relevant information from the target domain, needs analyses are designed to identify the goals and communicative needs of a particular group of learners. This might include building different linguistic or pragmatic skills, as well as promoting learners' knowledge of field specific registers, genres, or vocabulary. Findings are then used to inform the materials and curriculum for the target group of participants. Developing and administering language courses is a financially and time intensive undertaking for institutions, instructors, and students, thus underscoring the need for content relevant to learners' lives outside of the classroom (Long, 2015). Given the high stakes complications in the maritime industry from insufficient ME proficiency or cultural understanding, learning language to promote success and safety is critical.

As a first step in revising and updating the IMO "Model Course 3.17, Maritime English" following the 2010 amendments to the STCW, the IMLA conducted a needs analysis to better understand the needs of L2 mariners and ME learners. Following Long's (2005)

recommendations for multiple methods and sources, this needs analysis included a survey, unstructured interviews, textbook analyses, field observations, and a corpus analysis (Zhang & Cole, 2018). Stakeholders included experienced instructors at maritime educational institutions, maritime curriculum designers, members of the IMO, and maritime operation companies. Results demonstrated that industry stakeholders did not find mariners' ME proficiency to be adequate, particularly in terms of listening and speaking skills. For example, findings demonstrated that respondents felt both students and mariners already employed in ports and shipping companies had limited English competence, with only basic abilities to comprehend input and to produce comprehensible output. Participants also confirmed, as discussed at length above, that issues were caused by mariners' pronunciation errors, problematic listening, limited vocabulary and grammar, lack of cultural awareness, and lack of knowledge in how to appropriately use language in various situations (lack of pragmatic competence; Zhang & Cole, 2018). Importantly, observations demonstrated that seafarers often failed at real-world communication in terms of understanding diverse accents and coping with pronunciation errors, as well as inability to understand during both in-person and VHF radio communication (e.g., Uchida & Takagi, 2012a). In addition, seafarers had limited lexical and grammatical resources, thus impacting their abilities to competently and effectively provide directions or react to high stress emergent situations. Finally, observations also indicated substantial issues in terms of negotiating and giving and receiving orders, primarily due to poor cultural awareness and understanding. Taken together, these results encouraged IMO member states to recognize the value of genre-based curriculum design to promote learners' development of both technical and general English. Thus, this needs analysis informed the genre-based revisions, namely the GME and SME, for "Model Course 3.17, Maritime English." Although this course was revised with learners' specific needs in mind, it is meant to be a general guideline that instructors and institutions will modify to better fit their specific contexts and needs.

Because the IMO "Maritime Course 3.17, Maritime English" is intended to be modified for the unique features and needs of individual contexts, a small but growing number of needs analyses have been conducted to obtain a better understanding of learners' needs in individual maritime institutions and training programs worldwide. For example, previous research has demonstrated that within an Indonesian context, learners' vocabulary may be limited to the technical forms required for specific jobs and duties, leaving gaps in terms of general communicative abilities, thereby impacting every-day onboard communication and crew cohesion (e.g., Aeni, 2017; Bin-Tahir et al., 2017; Dirgayasa, 2014). Seeking to address this gap by developing a GME course specifically designed for Indonesian maritime students, Aeni et al. (2018) administrated surveys, exams, and interviews to 150 students enrolled in the nautical department of an Indonesian maritime academy. Results demonstrate that communication skills were highly important, with participants ranking writing and speaking as the most crucial skills, and ranking speaking and listening as their preferred method of learning. These results add support to previous research (Kourieos, 2015), in which students, specialists, and human resource managers in Cyprus emphasized

the importance of speaking, and indicated that more interaction opportunities were needed in maritime courses and training to provide real-world practice rather than the decontextualized, passive learning experienced by the participants. Similarly, Saray et al. (2021) found substantial gaps between training and the real-world needs of mariners in Istanbul, Turkey, with participants from vocational high schools reporting that their education was inadequate and had not provided them with the means to develop the needed levels of ME proficiency.

Despite the importance of interaction and speaking, participants in Aeni et al. (2018) reported that they practice reading and writing most often in their classrooms, demonstrating a mismatch in terms of students' needs and classroom practices. Importantly, students also reported that the materials used in their courses were irrelevant to their needs and that the teaching methods were not engaging. In addition, Aeni et al. (2018) examined a small subset of learners' anxiety during an oral communication task as well as their responses on a modified Foreign Language Classroom Anxiety Scale (FLCAS) questionnaire, with results indicating most participants exhibited moderate anxiety during L2 oral communication. Students reported that their primary goal in their English courses was to improve their communicative competence, as this would not only improve their speaking skills but also their anxiety associated with oral evaluation tasks. Overall, these results demonstrate how individual institutions or programs may struggle in terms of adapting the IMO recommendations and course module to their unique contexts, highlighting the importance of future needs analyses and teacher support in maritime instructional environments.

Ahmmed et al. (2020) focused on investigating the needs of Bangladeshi seafarers seeking onboard employment with local and international shipping companies. Surveying 135 senior cadets and 24 recruiting agencies, results identified 68 tasks, with speaking ranked as the most important skill by both cadets and agencies. Communication efficiency in terms of intermediate speaking skills was crucial as a spoken interview is part of most agencies' hiring process, with beginning level skills in listening, reading, and writing being considered acceptable. Findings also demonstrated that cadets ranked radio communication using VHF radio and communication with VTS services as the most important functions. Onboard communication, particularly communicating with agencies or managers as well as attending meetings, were also identified as highly needed functions by cadets. Describing procedures and giving directions were also ranked as highly needed tasks. Communication was the most vital, with participants stating that "speaking activities are needed in every on-board ship" and are necessary in "every activity." Importantly, cadets also highlighted the importance of pronunciation to facilitate interlocutors' comprehension. Findings also demonstrated that local recruiting agencies did not assess listening skills, instead requiring grammar and reading comprehension in addition to the spoken interview. Given that cadets reported listening as a critical skill for maintaining safety, particularly in terms of VTS and VHF radio communication, emergency communications, following orders, and understanding and reacting to distress messages,

these findings indicate an important gap in terms of training, recruitment agencies' priorities and evaluations, and the real-world needs on board vessels, underscoring the need for further research.

Following a task-based approach to needs analysis, Widyalankara (2017) administered a questionnaire and interviews to entry level cadets and ratings as well as experienced seafarers in Sri Lanka, seeking to provide perspectives on the current training and on the relevance and efficacy of the training programs for real-world applications in the maritime industry. All participants indicated that reading, writing, listening, and speaking were important, although listening and speaking were classified as very important. In addition, the beginning ratings were the weakest in all areas of L2 English, and overwhelmingly reported experiencing anxiety when speaking for fear of making mistakes, though they also uniformly recognized the importance of improving their L2 skills.

More recently, Mokhtari and Maouche (2023) investigated the challenges experienced by ESP instructors at a maritime high school in Algeria. Previous research suggests that language instructors in maritime institutions often lack field specific expertise, instead teaching a subject in which they have little experience and in which their learners may have more knowledge (Basturkmen, 2017; Bullock & Westbrook, 2021; Demkydenko, 2012; Zhang & Cole, 2018). This lack of knowledge, combined with the expectation that instructors will have the understanding and resources to modify the IMO "Maritime Course 3.17, Maritime English," may contribute to mismatches between course content and design, and learners' needs and experience, potentially causing demotivation (e.g., Aeni et al., 2018). Although the amended STCW describes instructor training, little research has empirically explored educators' needs and experiences. Taking a case-study approach, the authors examined ME teachers' opinions regarding the IMO "Maritime Course 3.17, Maritime English" as well as the challenges they encounter when trying to adapt and implement this course. Results from semi-structured interviews revealed that although teachers felt the IMO recommended a communicative approach, there were little to no resources available or provided in how best to implement this in the classroom. In addition, participants suggested that communicative competence and cultural awareness were critical for successful employment in the field, especially given the multilinguistic and multicultural nature of many crews (Mokhtari & Maouche, 2023). The teachers also perceived that their students were either not motivated or even demotivated, and speaking anxiety was observed to not be uncommon. All participants mentioned the lack of training, with one teacher stating, "I continuously feel stressed while in front of the students who know more than I do in the maritime domain. I spend hours to prepare my courses and the challenge is the specific vocabulary, let alone the general aspect of the program guidelines" (pp. 289). Furthermore, none of the instructors had engaged in collaborative teaching with domain experts or had additional training. These findings demonstrate that although revisions have been made to course recommendations and requirements, instructors nonetheless feel inadequately prepared and supported in terms of their abilities to teach ME courses, particularly those with domain specific content. These results underscore the

need for additional resources and teacher training opportunities, particularly in terms of pedagogical techniques and domain specific subject knowledge.

This absence of support for teachers in terms of implementing a specific pedagogical approach (in these cases, communicative or task-based language teaching) is in line with previous findings from applied linguistics, specifically in terms of applying task-based language teaching to the classroom. For example, studies exploring teacher training in TBLT have found that although teachers may be enthusiastic about bringing more interaction and tasks into the classroom, they feel there is not enough support and resources to do so (e.g., Bryfonski, 2021). Given that teachers play a critical role in the classroom (Van den Branden, 2016), providing sufficient training or facilitating collaborative or co-teaching opportunities is necessary. Connecting ESP educators with domain experts to support their technical knowledge, rather than having instructors rely on YouTube videos for content specific knowledge (Mokhtari & Maouche, 2023), may help alleviate some of the stress and challenges that instructors report experiencing.

Especially critical in ESP settings, in which language is learned in order to facilitate linguistic efficiency in a unique academic or occupational environment, is the need for language skills learned in the classroom to be directly applicable to authentic real-world situations (Ahmmed, 2018; Kaewpet, 2009; James et al., 2018; Moder, 2014). These locally focused needs analyses have identified a range of instructional mismatches and challenges in terms of how effectively programs are able to facilitate learners' development of the interactional, linguistic, and pragmatic skills necessary for the maritime industry. Although the revised IMO "Maritime Course 3.17, Maritime English" was informed by a needs analysis targeted IMO member states, these recent studies demonstrate that educators and programs are struggling with modifying the course to fit the needs of their students, underscoring the need for further research and more readily available resources to promote interaction and task-based language development.

Native English Speakers and Miscommunication at Sea

Thus far, the current white paper has explored the challenges that arise when non-native speakers of English have insufficient ME proficiency, as well as how communication problems can impact bridge team interactions and team cohesiveness. This section will address how native English speaking mariners' attitudes towards ME and the SMCP may impact communication.

Although the IMO and IMLA have sought to improve training for L2 seafarers, research highlights the importance of enhanced training for native English speaking mariners to raise awareness of linguistic and cultural differences in multinational crew. For example, research suggests that not only might native English speakers refuse to use the SCMP, they are perceived as rude by non-native speakers of English. For example, Uchida and Takagi (2012b) surveyed 28 Japanese VTS officers on the intelligibility and comprehensibility of

speakers from different L1s. Results indicated that American, Australian, and British English speakers often spoke too quickly and failed to use the standardized phrases from the SMCP, instead using plain English and expecting interlocutors to be able to understand, adding support to previous research demonstrating British speakers were often the most difficult for non-native English seafarers to understand (Loginovsky, 2002). Uchida and Takagi's (2012b) participants reported that vocabulary was an issue, as either the non-native English speakers' vocabulary was so insufficient that the communication was unsuccessful or the native English speakers, particularly American and British, used lexical items unknown to the L2 English VTS officers. One participant stated, "Native speakers use expressions that are intelligible only in their community" (pp.174), while another remarked "Americans' speech is too fast and too long with redundant and unfamiliar expressions" (pp. 175). In addition, participants reported that Americans were unsympathetic to instances where the officers may not have understood their utterance, and were instead rude or inconsiderate. For instance, one 30-year veteran officer remarked, "When asked to repeat, they either laugh or yell at me. I have been told to 'leave and bring a person who understand [sic] English,'" while another with six years of experience stated, "Americans appear to take it for granted that their language should be understood since it is a common language. Even asked to say again, they just repeat the same expressions and never slow down. They are very uncooperative." These findings suggest that the responsibility for miscommunication extends to native English speakers as well, demonstrating the need for improved training and awareness raising for American seafarers.

Furthermore, Uchida and Takagi (2012b) point out that although speaking slowly and clearly is outlined as essential for effective communication in the SMCP, native English speaking seafarers may not have experience using the standardized phrases, instead thinking they are relevant and necessary only for non-native speakers. The standardization among both native and non-native English speakers in the shipping industry has not been as complete and successful as in the airline industry, where regulatory standards include technological and verbal restraints designed to prevent communication errors. For example, speech is carefully scripted between pilots and Air Traffic Control (ATC) from the initial introduction to the closing of the interaction. Speakers must identify who they are and to whom they are speaking, and all information is confirmed through readbacks. Communication is task oriented, and interlocutors are highly discouraged from casual conversation or small talk (Howard, 2008). The rigidity of these scripted interactions provides a clear format for speakers and hearers to work with, making communication easy and predictable once the format is mastered, thus limiting the communicative and pragmatic challenges that L2 speakers may encounter. Within shipping, the SMCP has been an attempt to provide this type of formatting and structure to mariners from all linguistic backgrounds. However, potentially due to the different language related evaluation and certification practices across IMO member countries (Acar &Varsami, 2021), the use of the SMCP is not as well regulated. In addition, many native English seafarers continue to use non-standard English in place of standardized dialogue (Short, 2006). Additionally, native

English speakers receive little to no training on how and why to use the SMCP (Short, 2006; Ziegler, 2022), suggesting that more research is necessary to improve the training and expectations of American and British seafarers for multilingual and multicultural interactions.

Speech Acts and Miscommunication in Maritime English

The following section explores how linguistic and cultural differences influence the interpretation of the underlying meaning of speech acts and how these potential mismatches may contribute to miscommunication. In addition, this section will examine how cultural differences may influence the use of ambiguous language, thereby impacting successful communication.

Although both the SMCP and ME were designed to promote seafarers' L2 communicative competence, the lexical burden of these special terms and phrases is related not only to learners' linguistic knowledge but also their understanding of their tasks, duties, and field-specific knowledge (Demydenko, 2009). In order to support learners' understanding of this highly specialized terminology relating to specific aspects of the shipping industry, linguistic structures have been intentionally simplified through reduced forms. However, mariners rarely receive training or guidance in terms of pronunciation, the role of cultural differences on language use, or comprehension challenges. In other words, as Ziarati et al. (2009) highlight, the SMCP focuses on marine safety while failing to address the underlying issues or human causes that contribute to safety issues or complications. Grammatically, the SMCP phrases may not cause comprehension problems for ESL mariners, however the illocutionary force, for example, behind these phrases and speech acts may be more difficult for learners to decipher.

Although research has demonstrated that native speakers of English automatically recognize speech acts when they hear an utterance (Holtgraves & Ashley, 2001), non-native speakers' ability to recognize speech acts is not as quick or automatic (Garcia, 2004; Holtgraves, 2007). Speech acts can be defined as "the locutionary act (the basic literal meaning of an utterance), the illocutionary act (what the speaker intends by the utterance) and the perlocutionary act (the actual effect the utterance has on the hearer)(Davies, 2005, pp. 122). Thus, the connection between utterance and action is not always clear to the hearer, and depending on the context, there may be a number of ways to perform an action. The Message Markers associated with the SMCP are designed to reduce communicative or pragmatic failure relating to speech acts by clearly identifying the intended purpose of the utterance, therefore leading to the speakers' desired action and outcome. The markers themselves are explicit speech acts that are intended to direct the hearers' interpretation of the propositional meaning of the speakers' utterance. Table 1 provides the recommended guidelines for the use of each Message Marker, however, interpretation and use depend on individual situational assessments (Short, 2006).

Table 1.

Message Marker	*Definition and Use guidelines*
Instruction	Message implies the intention of the sender to influence others by a Regulation. Sender must have full authority to send such message and Recipient must follow legally binding message unless there are contradictory safety reasons.
Advice	Message implies the intention of the sender to influence others by a Recommendation. The decision whether to follow the advice stays with the recipient. One does not have to carry out the advice, but should consider it carefully.
Warning	Message implies the intention of the sender to inform others about danger. Any recipient of a warning should pay immediate attention. Consequences are up to the recipient.
Information	Message restricted to observed facts, situations, etc. Preferably used for navigational and traffic information. Consequences are up to the recipient.

SMCP (2001)

There are, however, issues with the use of Message Markers. First, because the usage guidelines are ambiguous, the potential for the hearers' perceived underlying meaning of the utterance to not match the speakers' intention is great. In other words, speakers may not know when to use the markers and listeners may not know how much urgency to infer from the use of a given marker. Additionally, factors such as cultural beliefs and power structure are likely to affect the Message Marker a speaker might choose depending on the interlocutor (Zhang & Cole, 2018), contributing to potential ambiguity that could lead to further pragmatic and communicative failures. Through their analysis of spoken communication in maritime contexts by both native and non-native English speakers, John et al. (2018) demonstrate that ambiguity is twice as likely to occur in non-native speech than native English speech. Their analysis also found that hedging, in which speakers seek to mitigate the forcefulness or criticism of an utterance through politeness (e.g., Lakoff, 1972), was significantly higher in directives produced by native speakers, potentially implying through the lack of directness that decision making is the responsibility of the hearer (John et al., 2018).

The American Liberty collision involving multiple vessels in the lower Mississippi provides an example of how ambiguity negatively impacted communication between the pilot and master. When the native English speaking pilot ordered for the engine speed to be increased, he hedged by including a qualifier in his command, stating "bring her up slow…whenever you can." According to the NTSB accident report (2020), the master

interpreted this with less urgency than needed, while the mate interpreted this statement as a suggestion rather than an order. This miscommunication, which highlights a mismatch between the speaker's intention and the hearer's understanding of the statement due to ambiguity, resulted in the American Liberty failing to obtain sufficient speed during undocking and subsequently colliding with multiple vessels and barges leading to over $40 million in damages. In addition, the pilot stated that he hedged rather than used standardized language because he was trying to be polite, as this was how he had been trained. This accident demonstrates how potential mismatches in speech acts and cultural expectations of politeness are particularly risky in bridge team communication, underscoring the need for further research exploring how these challenges might be addressed.

The Role of Culture in Miscommunication: Politeness Strategies, Saving Face, and the Role of Hierarchies in Maritime Accidents

Building on the discussion of speech acts above, the following section will discuss how politeness, power, and distance may play an important role in terms of how multicultural and multilingual seafarers interact. This section will also address how these factors impact communication amongst native English speaking mariners, highlighting the importance of awareness raising for both L1 and L2 English seafarers. Overall, this section will highlight how integrating more explicit awareness raising and training in terms of the use of speech acts and the role of cultural differences, particularly in contexts where power and social distance play an important role, may help to reduce miscommunication in multicultural environments.

Research in L2 learning has demonstrated that learners need more than just linguistic knowledge to successfully complete target language tasks, interactions, and duties, requiring information about the overall cultural context in which the language occurs. For example, studies have demonstrated that it is necessary to consider the influence of learners' pragmatic and sociocultural beliefs on the ultimate communicative success of the interaction (e.g., Gass & Varonis, 1991; Philp & Mackey, 2010). Linguistic and pragmatic failures have frequently led to miscommunication during highly stressful, technical maneuvers, in which there is often very little time or space to repair initial misunderstandings (Pyne & Koester, 2005; Trenkner, 2007; Ziarati 2006). As discussed above, groundings, fires, and other incidents are often a result of cultural differences as well as linguistic failures among the crew and shore personnel (Winbow, 2002). In these situations, cultural beliefs regarding hierarchical interactions, politeness, or face-saving may exacerbate existing confusion or miscommunication, thus intensifying problems and difficulties and contributing to the occurrence of an accident. For example, speakers' choices in using different face and politeness strategies, and thus whether an act is considered face threatening or not, affect the social distance between the participants, the power difference between the speaker and the hearer, and the imposition of the act. As the distance between interlocutors increases, the power of the hearer and the imposition of

the act will also change, impacting the speaker's choice of strategies. In general, as the weightiness increases, the speaker should select a less threatening strategy. Cultural differences in the values assigned to distance, power, and imposition also impact the speaker's selection of a specific strategy, particularly as some cultures may prefer the use of positive politeness strategies over negative politeness strategies, potentially impacting the communicative success of interlocutors from different cultural backgrounds.

Intercultural misunderstandings have been identified as contributing or causal factors in a number of accidents and incidents, including impacting communication between crew and pilots (e.g., Bright Field). These cultural beliefs regarding hierarchy, power, distance, and decision making in particular can have critical, and sometimes catastrophic, effects on communicative outcomes, particularly in terms of bridge management or the master/pilot exchange. For instance, in the Cosco Busan incident, the Chinese captain and the American pilot engage in miscommunication when the captain provides a guess-based response to a direct question. In providing this response, rather than admitting his lack of knowledge or contradicting the pilot, the captain is able to save face and adhere to politeness strategies, maintaining the perceived social and power roles between the participants, and also contributing to the miscommunication that led to the allision with the Bay Bridge (Ziegler, 2022). Similarly, the accident involving the Bright Field and the New Orleans River Walk was caused by miscommunication between the American pilot and the Chinese master. The Bright Field was experiencing engine failure, and because the communication between the bridge and engine room was exclusively in Chinese, the pilot was not aware of the mechanical issues or how they were being addressed. In addition, when the master was directly questioned by the pilot as to whether the functionality of the engine had been restored, the master "answered with "just a simple 'yes'" (NTSB report, 1998). According to Pyne and Koester (2005), the cultural practice of many Chinese crew is to respond 'yes' to authority figures, regardless of whether the true answer is negative. This provision of perceived, desired information may be driven by Chinese seafarers' preference to adhere to the traditional hierarchy (Pan, 2000) in which the pilot is the superior. In other words, rather than provide the pilot with accurate, truthful information, the captain is seeking to provide a polite, non-face threatening answer that supports the information he thinks the pilot already knows. Although the captain is ultimately responsible for the wellbeing of the ship and the voyage, he defers to the pilot due to the perceived higher social status, and is hesitant to contradict the pilot, instead forming his response based on what he believes the pilot wishes to hear (NTSB, 2007; Ziegler, 2022).

These findings lend further support to previous research (Uchida & Takagi, 2012b), in which Japanese VTS officers reported that Chinese seafarers will "say 'OK' even when they apparently do not understand us" (pp. 175). Fan et al. (2017) also report that due to the hierarchical nature of Chinese society, Chinese seafarers may be more reluctant than seafarers from other cultures to report an issue or question a superior due to the perceived power distance. More recently, this potentially culturally-driven inclination to defer to higher ranking interlocutors was cited as a possible contributing factor in the

collision of the Conti Peridot and the Carla Maersk. In this case, the pilot of the Conti Peridot failed to notify the master of the heading fluctuations and reported during the investigation that in his experience, “certain cultures tended to be more deferential and would not challenge a pilot” (NTSB report, 2015a, pp.22).

Previous research has suggested that the culture and social status of mariners has a substantial impact on communication particularly with respect to Chinese mariners (Ziarati et al., 2009). For example, Ziarati et al. (2009) describe the societal expectations and pursuit of perfection associated with China. According to Yongxing (cited by Ziarati et al., 2009), 71.3% of Chinese parents indicated that they expected their children to ”do everything as perfect as possible.” This emphasis on perfection may translate to delayed responses during interactions, as Chinese mariners may place greater value on accuracy and saving face rather than urgency and expediency of communication compared to speakers from different cultural backgrounds (Ziarati et al., 2009). As demonstrated in the Cosco Busan accident, cultural beliefs can impact the linguistic choices made by mariners, including how politeness strategies, power, and social distance may impact seafarers’ use of indirectness in interaction, with these decisions potentially contributing to accidents and incidents. For example, Pan (2000) examined Chinese politeness behavior, including the effects of power, distance, and imposition, in business encounters, meetings, and family gatherings. Pan’s results indicated that although gender and age play a role in influencing the speaker’s choice of politeness strategies, the ranking hierarchy is the most important factor to consider in politeness behavior. Pan’s findings indicate that in order to maintain group harmony and sustain the needs of the interlocutors to save face, many Chinese speakers feel it is imperative to acknowledge the hierarchical order of the participants, and following traditional Confucian behavior codes, position themselves in relation to others based on this ranking. Pan’s (2000) research suggests that the most high-ranking member of the conversation initiates and finalizes decisions, with lower ranking members demonstrating ‘face’ by supporting the higher member’s position through agreement and deference. This support is provided even though lower ranking participants may not agree with the decision, reflecting the importance of deference and politeness in the hierarchical scale.

The role of power and distance is not limited to one specific culture, however, with research demonstrating the failure to question decisions or orders of captains or officers from crew members from various cultures. For example, the grounding of the Bunga Teratai Satu on the Great Barrier Reef was attributed to the desire to save face and not challenge the decision making of Pakistani senior officers by Malaysian, Indonesian, and Myanmese junior officers and crew (Pyne & Koester, 2005). The lack of assertiveness and ineffective communication between the captain and the crew in terms of bridge resource management contributed to the collision of the St. Louis Express with the Hammersmith Bridge, the grounding of the Costa Concordia, and the sinking of the El Faro, which resulted in the deaths of all 33 crew members onboard (NTSB report, 2015b). In the case of the St. Louis Express, language also played a role, as the bridge team was not fully aware of the dangerous situation that was unfolding because they were unable to understand the

communication between the pilot and VTS, and thus could not take preventative action (NTSB, 2015c). However, face saving and politeness strategies, like indirectness, can vary across speakers from the same culture with the same native language, influenced by age, gender, region, ethnicity, and socio-economic status. For example, in the case of the El Faro, the crew did not express their concerns regarding Hurricane Joaquin and the route which would take them directly into its path, thus illustrating the dangerous implications power and social distance can have on speakers' use of indirectness. In aviation research, in which crew resource management has served as a model for bridge resource management in the maritime industry, Linde (1998) found that it was often the subordinate speaker who was indirect and that higher ranked interlocutors were more likely to ignore indirect hints from their subordinate interlocutors. Importantly, Linde's research demonstrated that the use of indirectness in cockpit communication led directly to accidents because the hints were either misunderstood or ignored by higher ranked interactional participants, highlighting the need for further research into the effects of power, distance, and imposition on indirectness in high-stakes situations, particularly in terms of bridge resource management.

Despite the growing body of work demonstrating the role of seafarers' cultural backgrounds in miscommunication or misunderstanding, cultural awareness training is still lacking in mariners' education (e.g., Wang & Gu, 2005). Studies suggest that seafarers recognize the important role that cultural backgrounds play in terms of effective communication, with 75% of mariners working as part of multicultural crews indicating that overall communication is affected by cultural differences (Ziarati et al., 2011) and over 30% reporting that communication was frequently impacted by cultural issues (Wang & Gu, 2005). Although culture is now directly mentioned as an important factor in the amended STCW, there seems to be a lag in the integration of direct cultural training or awareness raising in maritime training programs and educational institutions (Fan et al., 2017). In sum then, research suggests that evidence-based cultural awareness training should be integrated directly into ME curricula to better provide learners with the necessary knowledge and support to predict, navigate, and resolve the complex linguistic and cross-cultural situations encountered at sea (Brenker et al., 2017; Fan et al., 2016; Zhang & Cole, 2018). Raising seafarers' awareness of the potential mismatch between utterances and underlying meanings may help to promote better communication at sea.

General Recommendations for the Maritime Industry

This white paper has described multiple causes and contributing factors to miscommunication at sea, including seafarers' lack of proficiency in ME, mismatches in terms of learners' needs and classroom content, continued use of pedagogical approaches that may not effectively promote learners' development of communicative competence, and lack of instructor support for adapting and implementing the IMO "Maritime Course 3.17, Maritime English." For example, numerous studies highlighted the mismatch between learners' perceived needs at sea and the training they received during their education, with

results demonstrating the need for more interactive tasks and real-world, authentic communicative opportunities (e.g., Aeni et al., 2018; Fan et al., 2017; Zhang & Cole, 2018).The current paper adds to the findings of previous research calling for more authentic instructional materials and approaches (Ahmmed, 2018; James et al., 2018). In order for the maritime industry to successfully address these ongoing linguistic and pedagogical issues that are contributing to miscommunication, *MET programs should seek to inform their classroom practices with theoretical and empirical findings from applied linguistics research.*

With hundreds of empirical studies and numerous syntheses (e.g., Keck et al., 2006; Mackey & Goo, 2007; Ziegler, 2016), TBLT offers an ideal pedagogical framework for the instruction of ME. In contrast to more traditional methods of instruction that focus on grammatical items, TBLT takes tasks as the unit of organization and analysis (Long, 2015). Tasks are not only familiar to relevant stakeholders in the maritime industry, but they also provide opportunities for contextualized, authentic communicative practice needed by both L2 and L1 mariners (Ahmmed et al., 2020; Agustina, 2018; James et al., 2018). Grounded in the interaction approach to Second Language Acquisition (SLA, Long, 1996; Mackey & Gass, 2006), TBLT is hypothesized to promote L2 development by providing opportunities for learners to receive comprehensible input, produce output, negotiate with their interlocutors, and receive feedback on their erroneous utterances during conversational interactions. Negotiation and feedback may also provide learners with opportunities for noticing, in which learners notice a gap between their production error and more target-like production, a necessary condition for learning to take place (Schmidt, 2001). Thus, because interaction "connects input, internal learner capacities, particularly selective attention and output in productive ways" (Long, 1996, pp. 451–452), tasks can provide learners with an ideal psycholinguistic environment to both focus on form and meaning, developing their understanding of structure and use. By implementing more interactional tasks and task-based approaches into maritime education and training programs, learners may improve not only their language proficiency but their communicative competence as well, thereby closing the gap between current educational outcomes and the real-world needs at sea. As Li et al. (2023) point out, "the theory and practice of ME teaching should also be based on the relevant theoretical research of pedagogy, psychology, linguistics, applied linguistics, etc. Moreover, it must also consider the research of professional theories to form a systematic theoretical framework for the ME course" (pp.13). *Drawing on research-based pedagogies, such as TBLT, will provide a theoretically and empirically sound foundation on which to build more effective ME courses.*

In addition, resources supporting instructors' use of tasks should be made more readily available. Although teacher training and support remains a challenge in applied linguistics as well (e.g., Bryfonski, 2021; Van den Branden, 2016), there exist a number of resources for general English tasks that ME instructors might integrate into the GME portions as they modify and adapt the IMO "Maritime Course 3.17, Maritime English." For example, the Task Bank at Indiana University provides open-access to peer-reviewed tasks for use in the L2

classroom. Although not specifically aimed at ME, these tasks may be a useful resource for instructors with little experience in designing and applying their own tasks in the classroom. *Programs may also benefit from collaborating with TBLT experts from applied linguistics to provide teacher training or ongoing support in terms of task-based teaching and designing and adapting tasks to their unique instructional contexts.*

Research has also demonstrated how native speakers of English may contribute to miscommunication due to lack of training in using standardized communication tools, such as the SMCP, as well as the mismatch between expectations and reality in terms of L2 English seafarers' communicative competence. Based on these findings, *L1 English seafarers should receive direct training to encourage the use of standardized phrases as well as avoiding ambiguity and hedging during interactions.* In addition, *L1 English mariners may benefit from training to deepen their understanding of the contexts in which miscommunication is most likely to occur*, such as bridge team communication and pilot-master interactions (Chauvin et al., 2013; Graziano et al., 2016; Macrae, 2009; Pourzanjani, 2001; Uğurlu et al., 2015) and raise their awareness of potential intercultural differences that may complicate interactions (Brenker et al., 2017; Fan et al., 2017). For example, *L1 English seafarers might undergo training to better understand the hesitancy of junior officers to question or contradict pilots or more senior officers* (Pyne & Koester, 2005), particularly if L2 mariners are from relatively hierarchical cultural backgrounds.

Finally, a growing body of research has demonstrated the crucial role of culture as a potential factor in miscommunication (e.g., Noble et al., 2011; Wang & Gu, 2005; Ziarati et al., 2011). Although stakeholders are aware of intercultural misunderstanding as a possible contributing cause to communication caused accidents, more evidence-driven direct training and awareness raising is needed in maritime programs worldwide to help reduce the impact of these factors on communication and psychosocial dynamics like isolation or alienation (Brenker et al., 2017; Fan et al., 2016; Zhang & Cole, 2018). *Providing seafarers with evidence-based direct instruction and discussion on how cultural perspectives of power, distance, directness, and politeness may impact communication may help to mitigate potential negative effects, and will additionally support learners' pragmatic and communicative competence.*

Recommendations for the Prince William Sound Regional Citizens' Advisory Council: Evidence Based Suggestions

Building on the findings of this white paper, which demonstrate a need for updated and revised materials to facilitate learners' linguistic, communicative, and pragmatic skills, the next project phase will investigate the *how* and *what* of the content that should be included in future professional development, awareness raising, and language training for various stakeholders by conducting an exploratory needs analysis. Taking a task-based approach to address the mismatch between existing materials and learners' needs, as well as answer calls to provide more authentic interactional opportunities in MET (e.g., Aeni et al., 2018;

Ahmmed, 2018; Ahmmed et al., 2020; Agustina, 2018; Li et al., 2023; James et al., 2018), this phase will take the initial steps to identify the necessary components of a successful ME course, providing ESP and content-based instructors with valuable information for curriculum design, materials development, and performance evaluation. This phase will also address multiple calls by previous researchers (e.g., Acar & Varsami, 2021; Oraith et al., 2021; Hasanphahić et al., 2021; Pyne & Koester, 2005; Tzannatos & Kokotos, 2009) to conduct a comprehensive analysis of incident and accident reports involving miscommunication by exploring the available transcripts, interviews, and other data in NTSB reports and dockets. This analysis will extend the findings of previous work (e.g., Acejo et al., 2018) by exploring how linguistic, communicative, cultural, and pragmatic factors contribute or cause internal and external miscommunication, and will address an important gap in the research by providing an up-to-date evaluation of how miscommunication contributed to accidents and incidents in North America, an area that has been under-researched compared to Asia and Europe. In addition, this phase will seek to provide the perspective of experienced industry experts, such as active and retired marine pilots and other maritime stakeholders operating in Prince William Sound. Overall, given the important role of language and culture, there is a clear need for a deeper linguistic and pragmatic analysis of the factors impacting communication. Phase 2 will seek to fill this gap by providing a holistic perspective on the linguistic, pragmatic, social, and cultural needs and practices of stakeholders relevant to the North American maritime industry and Prince William Sound region.

Conclusion

This white paper has established and highlighted the causes and contributing factors of maritime miscommunication by reviewing and synthesizing previous research. Findings demonstrate that despite various actions to improve instruction and reduce miscommunication, accidents due to miscommunication are increasing, underscoring the need for further research. Drawing on both synthetic and empirical research, this paper has identified the following causes and contributing factors to miscommunication during ship-to-ship, ship-to-shore, and onboard interactions: insufficient language proficiency and communicative competence, cultural differences and misunderstandings, poor bridge team resource management, psychosocial factors, ineffective and outdated pedagogical approaches, mismatches in terms of training and the real-world language needs of seafarers in the maritime industry, lack of training and use of standardized language, use of plain English by native English speaking seafarers, and ambiguity in terms of intended and understood meaning. Challenges related to proficiency, communicative failures, and teaching practices may be addressed by the implementation of more interactional and task-based language learning opportunities, thereby providing learners with opportunities to improve their linguistic and communicative competencies through authentic, real-world language use. However, research demonstrates that task-based resources are scarce, highlighting the need to design and develop task-based instructional materials and procedures, focusing on linguistic, communicative, and pragmatic issues, for each

component of maritime communication, including ship-to-ship, ship-to-shore, and onboard interactions between native and non-native English speaking pilots, masters, and crew. In addition, native English speaking mariners would benefit from direct training regarding the use of the SMCP, as well as awareness raising in terms of predicting intercultural perspectives and environments susceptible to miscommunication.

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