

## Enhancing maritime pilotage: exploring the role of negotiation of meaning strategies in training and operations

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### ABSTRACT

This study delves into the perspectives and expectations of 37 novice maritime pilots on the application of negotiation of meaning strategies in pilotage operations, aiming to enhance training programs and communication in critical maritime contexts. By conducting qualitative interviews with a mix of experienced and novice pilots, the research sought the role of these strategies in promoting safe and efficient navigation. Participants provided insights through open-ended questions, leading to a thematic analysis that identified recurring themes and patterns in their responses. This approach revealed a detailed view of the communicative strategies employed by pilots, emphasizing their role in navigating the complex maritime environment. The analysis highlighted a series of nuanced communicative challenges faced by novice pilots, pointing to the need for a comprehensive understanding of context and communication strategies in the maritime setting. The findings suggest a shift towards more dynamic, interactive, and scenario-based training methods. Emphasizing the importance of incorporating standard marine communication phrases (SMCP) and participant-driven learning approaches, the study advocates for training that aligns with global standards and the realities of maritime operations, underscoring the importance of enhancing communication efficacy to ensure safety and efficiency in pilotage operations.

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## 1. INTRODUCTION

Pilotage, a crucial element in maritime operations, ensures the safe navigation of vessels through challenging and unfamiliar waters. The expertise of maritime pilots, deeply rooted in their understanding of local maritime conditions and hazards, is instrumental in preventing accidents and safeguarding the environment. Despite the critical nature of pilotage, incidents and accidents still occur, indicating the need for enhanced training and communication strategies. Previous studies [1]–[3] have highlighted the indispensability of pilotage, yet acknowledge the persisting accidents under its watch, emphasizing the complexity of maritime navigation and the multifaceted approach required for maritime safety. Research conducted in Indonesia [4] has raised concerns about the quality of pilotage services, underscoring the need for ongoing improvements.

The reliance on pilotage alone does not eliminate the risk of accidents, with factors such as human error, mechanical failures, and unpredictable weather conditions continuing to challenge maritime safety. This reality underscores the importance of continuous training and adherence to high standards in pilotage

practices to mitigate risks. Moreover, the communication strategies employed by pilots, particularly in the negotiation of meaning with the crew, have not been extensively explored in academic research, suggesting a need for a deeper investigation into how pilots convey and negotiate information, a key factor in ensuring the effectiveness of pilotage operations [5]–[7].

Communication strategies in high-stress professions like maritime piloting are crucial due to the critical responsibilities pilots bear. Stressors include environmental conditions, tight scheduling, and the complexity of navigational tasks. Extensive studies in professions such as healthcare, emergency services, and aviation have explored the implications of communication strategies on operational efficiency and safety. These studies highlight the importance of adaptive communication strategies, stress coping mechanisms, and cultural competence in communication, suggesting their applicability to maritime pilotage [8]–[11].

Effective communication, including tailored negotiation of meaning strategies, is crucial in pilotage to bridge comprehension gaps and ensure safe navigation, despite varied English proficiency levels among pilots and crew [12]–[14]. The concept of negotiation of meaning encompasses a broad spectrum of strategies crucial for effective communication, especially in contexts involving non-native speakers. Strategies such as repetition, reformulation, and requests for clarification are pivotal in enhancing understanding and preventing misunderstandings [15]–[17].

Perception, involving the active selection, organization, and interpretation of information influenced by individual experiences and cultural backgrounds, affects communication and interactions significantly [18]. This study focuses on the perceptions of novice maritime pilots towards negotiation and meaning strategies in pilotage operations, highlighting the importance of understanding these perceptions for enhancing pilot performance and ensuring safe navigation. While existing research has addressed human error and reliability in maritime operations [19]. There is a notable gap in the literature on strategies to enhance maritime pilot skills for safer and more efficient operations.

The interplay between cognitive, psychological, and cultural factors in ensuring safe and efficient maritime operations has been highlighted in recent studies, offering valuable perspectives on enhancing communication strategies to mitigate the impact of stress on maritime pilots. This research aims to delve into the dynamics of negotiation of meaning within pilotage operations, examining the perceptions and experiences of novice maritime pilots regarding the use of these strategies in their work. By focusing on novice maritime pilots' perceptions of negotiation of meaning strategies, this study seeks to enhance the caliber of training programs for pilotage and improve communication during crucial maritime operations [20]–[22]. This study addresses the critical role of negotiation of meaning strategies in pilotage, aiming to deepen our understanding of their application and impact. Through examining novice maritime pilots' perceptions, this research seeks to contribute valuable insights into effective communication practices in pilotage operations, with the potential to inform training and operational improvements, ultimately contributing to safer maritime navigation and operations.

## 2. METHOD

This study adopted a qualitative methodology to delve into the intricacies of English communication within the scope of maritime pilotage operations. The approach centered on the lived experiences of maritime professionals. It aims to capture their insights into the communication challenges and strategies integral to pilotage.

### 2.1. Participants

For this study, 37 maritime pilot trainees engaged with our questionnaire, with a subset of 30 expressing willingness for in-depth interviews. These numbers of participants were considered proper by the researchers, as in qualitative research, the number of samples can be considered proper or sufficient when it can achieve the research purpose [23]. Our purposive sampling targeted individuals who demonstrated an insightful understanding of negotiation of meaning strategies during their maritime English courses. The selected participants were interviewed during their apprenticeship, integrating the research seamlessly with their training schedule. The researchers were able to gather rich, detailed data that provided valuable insights into the effectiveness of language learning strategies in the maritime industry.

### 2.2. Data collection procedures

The study's methodology included a survey with Likert-scale questions answered by participants, coupled with semi-structured interviews conducted with a chosen group. This dual approach was essential for delving into the complex perceptions and expectations of novice maritime pilots regarding the use of negotiation of meaning strategies in their operations. The combination of surveys and interviews provided a comprehensive view, starting with broad numerical data and moving to in-depth discussions to further explore the topic. The following interview questions were meticulously designed to initiate meaningful

conversation: i) What factors do you think are crucial for enhancing the safety of pilotage operations?; ii) Would you include effective communication as one of these factors?; iii) In your opinion, what makes communication effective?; iv) Do you think understanding and negotiating meaning is a part of effective communication?; v) What are the advantages of being proficient in negotiating meaning for maritime pilots?; vi) What difficulties could arise if a maritime pilot lacks skills in negotiating meaning?; vii) How important do you believe it is to include training on negotiating meaning in maritime pilot training programs?; and viii) What are your hopes for the future of maritime pilot training, particularly regarding skills in negotiating meaning?

### 2.3. Data analysis

Thematic analysis, a qualitative method aimed at identifying patterns within data for in-depth exploration of phenomena and effective for analyzing qualitative data gathered by researchers [24] was employed in this study to meticulously uncover themes related to English communication, pilotage operations, and negotiation of meaning strategies. This method, foundational to qualitative research analysis [25] involves a six-stage process illustrated in Figure 1, beginning with 'familiarization' deep immersion in the data to understand its nuances followed by 'generating initial codes' to systematically highlight relevant aspects. The 'searching for themes' phase then organizes these codes into preliminary themes, such as training needs and operational challenges, which are defined in the 'reviewing themes' stage into clearer categories like expectations for future training and strategies for negotiation of meaning. This leads to the 'defining and naming themes' step, where themes are detailed, emphasizing their significance, for instance, the necessity for enhanced English communication scenarios in pilotage training. The process culminates in the 'writing the report' phase, offering a comprehensive synthesis of the themes, with reflexivity maintained throughout to ensure the research remains grounded and objective, thus providing insightful analysis of the communication strategies in maritime pilot training and operations [26].

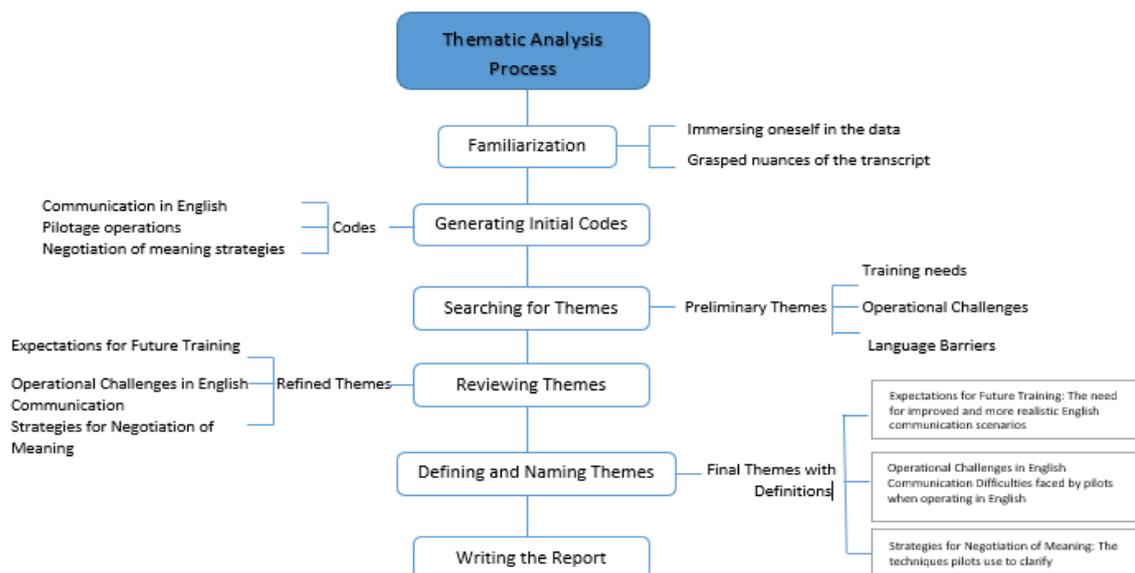


Figure 1. The stages in the thematic analysis process

## 3. RESULTS AND DISCUSSION

### 3.1. Perceptions towards the negotiation of meaning skills

The results section begins by presenting the quantitative data which informs us about the participants' views on the significance of negotiation of meaning in their professional activities. The following table outlines the demographics of those involved in the study, which included novice maritime pilots actively engaged in training. This group was carefully chosen based on strict criteria, which included holding the necessary certifications, having relevant maritime experience, maintaining good health, and achieving a minimum score of 350 on the test of English as a foreign language (TOEFL) exam, as required by regulation [27]. The tabular data encapsulates key demographic details such as age, gender, and the level of pilot training, which is either level 1 or 2.

Figure 2 shows that our participant group predominantly consists of males (94.6%) and falls largely within the age bracket of 30 to 39 years, which comprises 46% of our cohort. This is followed by participants aged 40 to 49 years, representing 43%. Those 50 years and older make up the remaining 11%. All participants are currently undergoing level 2 training, which is the foundational stage in becoming a maritime pilot. This demographic snapshot is pivotal for providing a context-rich interpretation of the participants' viewpoints and is instrumental in identifying variables that may influence the study's outcomes, allowing for a more refined and insightful analysis of emerging patterns and trends.

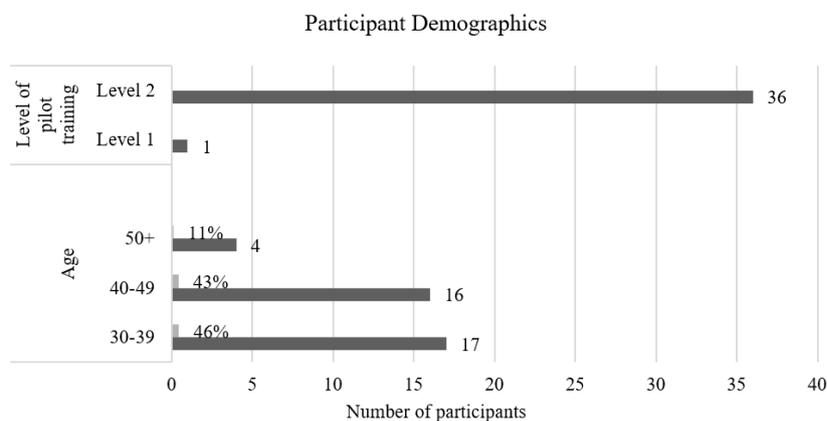


Figure 2. Participants' demographics

Figure 3 presents the results of the Likert-scale responses (rated 4 or 5), indicating varying degrees of agreement regarding the importance of negotiation of meaning skills in maritime operations. The majority (95%) acknowledge the critical nature of these skills for effective communication in the pilot profession. Additionally, 97% agree that these skills contribute to safety in maritime operations, while 95% recognize their value in promoting coordination and 94% in facilitating collaborative efforts. Furthermore, 81% of participants are aware of the potential for these skills to prevent misunderstandings and dangers.

Aligned with the data presented, a significant majority (95%) of participants recognize the crucial role of negotiation of meaning skills as essential for effective communication within the maritime pilot profession. The data also reflects a strong consensus (97%) that the development of these skills is beneficial for the safety protocols that govern maritime operations. Additionally, the survey indicates that most participants (95%) agree on the importance of these skills in achieving smooth coordination, and 94% believe they are key to successful collaborative efforts. The data further reveals that a sizeable portion of participants (81%) is aware of how these skills can help prevent misunderstandings and potential dangers in the operational context.

As indicated in the participants' demographic chart (Figure 2), most participants, accounting for 89%, were between the ages of 30 to 49 while undergoing Level 2 maritime pilot training in Indonesia. This demographic indicates a significant accumulation of experience and expertise among the participants within their profession. According to the Minister of Transportation's regulations, maritime pilots must be between the ages of 30 to 60, hold a minimum of a level 3 nautical diploma, possess a pilot and endorsement certificate, have at least three years of experience as a master or captain on vessels over 1000 GT, and be knowledgeable about local maritime areas. Moreover, holders of a level 4 nautical diploma are recognized for their comprehensive mastery of maritime English, as outlined in the IMO model course 7.03 [28]. This qualification ensures they possess the essential communication and navigation skills required for English-speaking maritime settings. In the interview, the participant shared their perceptions about the job:

Excerpt 1.

*"We know that the pilot is only an advisor onboard. So, the pilot is not the one to decide where the ship would go. If the captain doesn't take the advice, it's okay. Usually, the captain would give us the cause... Sometimes, mainly if the ship is coming to a port for the first time, we as pilots can provide a good performance to the captain, meaning to get the captain's trust... so, for example, if we have good planning, we know the route, we know our duties, we can explain that."*

Excerpt 1 clarifies the role of maritime pilots in navigation and decision-making processes aboard ships. It emphasizes that pilots serve primarily as advisors rather than decision-makers. The ultimate responsibility for the ship's course lies with the captain, who may choose to accept or disregard the pilot's advice. The passage also highlights the importance of the pilot's ability to instill confidence in the captain, especially during critical operations like entering a port for the first time. Through thorough planning, knowledge of the sailing route, and understanding of port characteristics, pilots aim to provide reliable guidance. This approach not only facilitates smoother operations but also fosters trust between the pilot and the captain, underscoring the pilot's advisory yet crucial role in ensuring safe and efficient navigation.

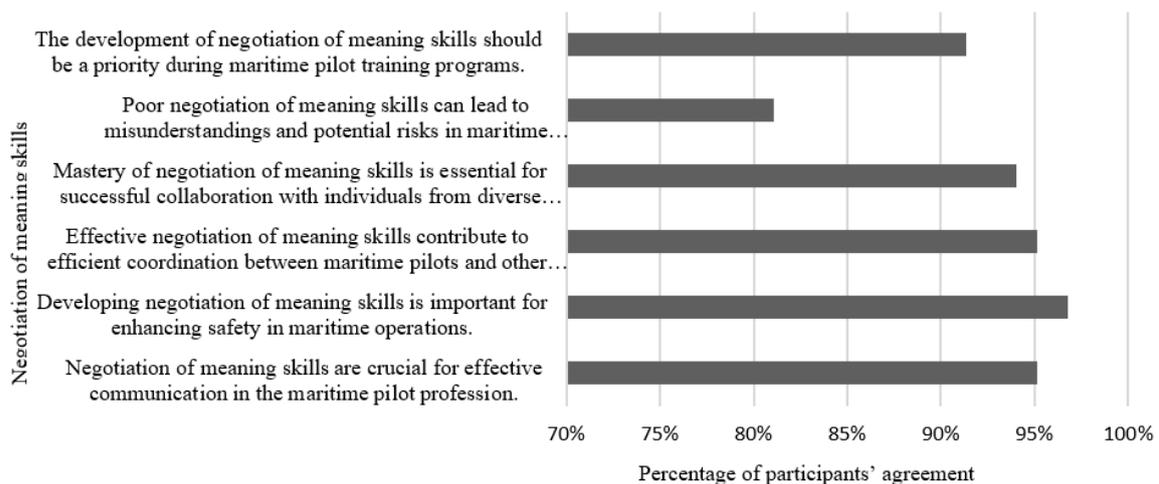


Figure 3. Participants' perception towards the negotiation of meaning skills in maritime operations

While pilots are primarily advisors, not decision-makers, their job requires them to instill confidence in captains, especially during critical moments like entering a port. This advisory role demands not only extensive knowledge and planning but also significant mental resilience. The study by Main and Chambers [29] underscores the psychological toll these responsibilities can take, with pilots experiencing stress and job dissatisfaction that may impact their mental health and performance. Despite their critical role in navigation and safety, there is a noted lack of current research on how modern technologies and commercial pressures are reshaping the stresses faced by pilots. This gap highlights the need for updated studies to better understand and address the well-being of pilots in the face of evolving maritime challenges. These insights emphasize the dual nature of pilots' work: as crucial navigational advisors requiring confidence and trust, and as professionals facing significant stressors that can affect their well-being and effectiveness. Addressing these challenges is vital not only for the safety and efficiency of maritime operations but also for the health and satisfaction of the pilots themselves.

Communication serves as the core medium of pilotage operation particularly among the bridge team, who may be coming from various linguistic and cultural backgrounds. The necessity for a common language and the reliance on standard marine communication phrases (SMCP), coupled with the use of unofficial marine phrases and gestures, showcases the adaptive and nuanced approaches pilots must take to ensure safety and efficiency in maritime operations. These communication strategies not only facilitate operational success but also serve as a bridge in building trust and confidence between pilots and captains, a crucial element in the collaborative effort to navigate ships safely into ports. This discussion of communication nuances complements the earlier analysis by shedding light on the practical skills and interpersonal dynamics that underpin the pilot's advisory role, further illustrating the multifaceted nature of pilotage in the modern maritime world.

Excerpt 2.

*"We serve ships from many countries... So, we must have one same language. So, we can have same understanding. It should be using the SMCP. Sometimes in this industry, we have practicalities that may not be registered elsewhere, which other people may not know. So, there are certain phrases in marine that only marine people know. It means that there are examples of orders that are not listed in SMCP. We also communicate a*

*little differently, less understandable for the crew from other non-English speakers. That's why SMCP is important. It's also important to learn from seniors who have done a lot. I usually use gestures to help me communicate."*

This excerpt underscores the importance of having a standardized form of communication in the maritime industry, especially given the international nature of the sector where ships and their crews often come from diverse linguistic backgrounds. The SMCP are highlighted as a critical tool for ensuring mutual understanding and effective communication across different nationalities. However, the speaker also acknowledges the existence of practical, unregistered elements and specific phrases unique to the marine environment that may not be universally known, even within the scope of SMCP. This reality necessitates the use of additional methods, such as gestures, to ensure clarity and prevent misunderstandings. The emphasis on the pilot's role as an advisor and the need to build trust with the captain, particularly in situations unfamiliar to the captain, further illustrates the complex dynamics of pilot-captain interactions.

It also highlights how maritime pilots leverage negotiation and communication strategies, including the use of SMCP and maritime-specific lingua franca, to foster trust with ship captains. Effective communication is essential for seamless pilotage [19], with a focus on repeating and confirming orders to prevent any misunderstandings. When standard communication fails, pilots resort to gestures to enhance clarity and ensure mutual comprehension. A clarification strategy is particularly employed when there's a significant gap in communication between the pilot and the captain, facilitating a mutual understanding crucial for operational harmony. Moreover, the narrative stresses the importance of pilots being cognizant of cultural and linguistic differences that could affect communication. This awareness aids in building trust with captains, especially important when a vessel is entering a port for the first time. By implementing clarification and confirmation strategies, where English is used as a lingua franca, pilots are equipped to address potential communication challenges proactively [30], laying the groundwork for trust. Such practices are instrumental in promoting safer and more efficient port operations, underscoring the critical role of communication in maritime navigation and safety.

**3.2. Enhancing maritime pilot training: insights on the negotiation of meaning and communication strategies**

The comprehensive data collected from maritime pilot trainees shed light on several critical components that could enhance training programs in pilotage. Participants' feedback focused on the acquisition of negotiation of meaning skills, leveraging SMCP, and improving overall communication abilities. Table 1 encapsulates the key elements derived from the participants' perspectives.

Table 1. Insights on training enhancements for maritime pilots

Element	Details
Skills to be acquired	Trainees highlighted the necessity of mastering negotiation of meaning strategies, particularly those grounded in SMCP, to facilitate effective communication.
Post-training expectations	There is a positive outlook among participants that mastery of these skills would significantly boost professionalism within the field.
Learning support and resources	A collaborative learning environment is recommended, involving expert-led pilot training, field practice, peer learning, and stakeholder engagement, including senior pilots, the Pilots' Association (PPU), government, and other relevant entities.
Training concerns and challenges	A portion of trainees (62%) expressed concerns about potential communication lapses, insufficient practical field experience, and perceived inadequacies in communication skills. Meanwhile, 38% reported no significant worries regarding the training.
Additional training recommendations	Suggestions for the curriculum include a stronger emphasis on the practical application of SMCP, extended field practice sessions to reinforce learning, and motivational components to boost trainees' confidence and situational awareness concurrently.

Table 1 provides a detailed synthesis of the trainees' expectations for the evolving maritime pilot training curriculum. The vast majority of trainees stressed the critical need for acquiring negotiation and communication skills, viewing them as indispensable for aspiring maritime pilots. Reflecting this view, a participant articulated:

Excerpt 3

*"(Negotiation of meaning) is necessary. Pilots must have that, yes, he can be a good negotiator, also a good advisor. The skills can help maritime pilots be good advisors to the master or captain aboard a ship that's entering a port."*

Excerpt 3 underscores the essentiality of negotiation skills in the maritime piloting profession. It reflects the belief that in addition to their navigational responsibilities, pilots must also be adept negotiators and advisors. This necessity is rooted in the collaborative nature of piloting, where the pilot, while not the final decision-maker, must effectively communicate and advise the ship's master or captain, especially when

guiding a vessel into a port. The ability to negotiate meaning ensures that instructions and information are clearly understood and agreed upon, facilitating a safe and efficient entry into the port. It is an affirmation that the skill set of a maritime pilot extends beyond technical knowledge to include strong communication and advisory capabilities. The importance of communication skills in maritime operations has been emphasized, for instance, in studies that examine the teamwork on the bridge of a ship and how communication failures can lead to accidents at sea [31].

Most trainees expressed concerns that centered on issues of communication gaps, a lack of hands-on training experience, and overall deficiencies in communication skills. To address these concerns, a proposal was put forward for a training curriculum anchored in the use of SMCP [32], with a strong emphasis on the incorporation of practical field exercises over more extensive training durations. Within the discussions, a participant highlighted the importance of a hands-on approach to training, pointing to the need for immersive training experiences that include realistic simulations to enhance skill development and preparedness.

Excerpt 4

*"More communication practices. There are some friends who are not confident enough to speak in front of the class. Their confidence is different when they're in class and when they're alone. When there is a lecturer, I think we lost our confidence. So maybe we can have recorded practices on videos and make the learning like a game."*

Excerpt 4 addresses the issue of confidence among maritime pilot trainees when it comes to communication, particularly in a classroom setting. It suggests that while trainees acknowledge the need for more communication practice, some may feel intimidated or less confident when required to speak in front of peers and instructors. This discrepancy in confidence levels can be a barrier to effective learning and skill development.

The integration of augmented interactive exercises and contextually driven training is proposed to prepare novice pilots more effectively for real-world scenarios they may face in port environments. Such interactive exercises, including role-play simulations, have been recognized as beneficial in previous research on Indonesian maritime pilots [33]. Trainees also advocate for teaching methods that support both solo and group practice to enhance self-efficacy. This is in harmony with the idea of incorporating motivational engagement into the training process to boost confidence and cognitive sharpness. This collective input from the participants reveals a consensus on the importance of these skills for both personal growth and the improvement of maritime operations' safety and efficiency.

Incorporating alternative methods such as video assignments could address issues of confidence in communication, especially for those who may feel apprehensive speaking in front of classmates and instructors. This approach can help create a supportive learning environment that fosters individual confidence and encourages more dynamic participation. Additionally, utilizing game-based learning materials could provide an interactive and less formal context for communication practice, which aligns with the proposed pedagogical strategies aimed at strengthening individual and collective competency. Overall, the feedback emphasizes the need for innovative, confidence-building training approaches that keep pace with the evolving demands of the maritime industry.

#### 4. CONCLUSION

This study set out to unravel the complexities of communication and negotiation of meaning within maritime pilot training, guided by two essential inquiries: the particular communicative challenges that novice pilots face, and how maritime pilot training can be enhanced to impart these critical skills more effectively. The thorough examination of data points to a web of nuanced communicative obstacles that novice pilots encounter, centering on the necessity for a deep, contextual grasp and the adept negotiation of meaning in the ever-shifting seascape of maritime operations. Our findings underscore the need for a shift towards more dynamic, interactive, and scenario-focused training methodologies. This recommendation goes beyond mere curricular design; it signifies a foundational transformation in the pedagogy of maritime pilot training. The adoption of SMCP and participant-driven learning methods stand out as vital for syncing training with global standards and the practicalities of maritime operations.

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