Research Article

Development of a Structured Competency Training Program for Coast Guard Non-Maritime Junior Billet Officers

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ABSTRACT

The Philippine Coast Guard (PCG), as the premier national agency responsible for maritime safety, security, and marine environmental protection, relies on competent shipboard officers and seaworthy vessels to achieve mission readiness and success. However, many shipboard officers lack collegiate maritime education, creating challenges amid the PCG Modernization Program. This study developed a competency-based training program to enhance the shipboard capabilities of these non-maritime officers. Using a mixed-method design, it surveyed Junior Shipboard Operational Level Course (JSOLC) instructors to evaluate course effectiveness, interviewed PCG commanding officers and merchant marine masters/chief engineers for insights on essential watchstanding competencies and best practices, and tested 49 current non-maritime officers on their knowledge and understanding of watchstanding and Coast Guard-specific protocols. The findings revealed strengths in PCG customs and protocols but significant gaps in collision regulations, navigation, marine engineering, and practical shiphandling. These deficiencies underscore the need for targeted training to align skills with operational demands. Based on the results, a structured competency-based training program was developed to address these gaps, improving shipboard efficiency and supporting mission success. The program emphasizes practical modules in navigation, shiphandling, and engineering, supplemented by STCW-aligned assessments. This contributes to competency-based training literature by highlighting education-job mismatch in Coast Guard-maritime contexts and offers practical recommendations for PCG shipboard curriculum enhancement.

Keywords: *PCG Maritime Shipboard Operations, Competency Based Training, Practical Training, Mission Readiness*

Introduction

As an archipelago composed of 7,641 islands with a 36,289-kilometer coastline, the socioeconomic development of the Philippines is heavily anchored in the maritime sector (MARINA, 2018). Millions of Filipinos earn their living through the nation's waters while maritime trade drives economic growth. Under Republic Act No. 9993 (Coast Guard Law of 2009), the PCG is the lead agency for maritime safety, security, and marine environmental protection (14th Philippine Congress, 2010). Using white-hulled vessels like the BRP Teresa Magbanua and BRP Bagacay, the PCG also faces the nation's geopolitical challenges in the West Philippine Sea and responds to regional crises like the recent 2023 Oil Spill in Oriental Mindoro (De Galicia, 2023). To sustain operational readiness, the PCG's Coast Guard Fleet ensures vessel and personnel readiness through regular repairs and personnel training. Ultimately, the effectiveness of the PCG in safeguarding the nation's maritime interests ultimately depends on the competency and readiness of its junior billet officers.

When it comes to maritime education and training especially in the PCG, competency has been the litmus test in order to ensure the proper acquisition of job-specific skills. Competency, which is defined as the combination of knowledge, skills and attitudes required for effective performance, is foundational in every organization including the PCG (Tripathi & Agrawal, 2014). Although not fully binding for government vessels, the International Convention on Standards of Training, Certification, and Watchkeeping for Seafarers (STCW) offers a framework for evidence-based competency evaluation (Gundic et al., 2020).Within the Coast Guard Fleet, the Junior Ship Operational Level Course (JSOLC), administered by the Fleet Education, Training and Doctrine Institute (FETDDI), serves as the pre-requisite for non-maritime officers prior to deployment on PCG vessels. However, the literature on PCG officer training is minimal and existing research only focuses on senior roles aboard ships. For example, Berbie (2024) examined the competencies of PCG commanding officers but the junior billet officers had not been examined thoroughly.

A significant challenge for the Coast Guard Fleet is the education mismatch among its shipboard officers. Approximately 45% or almost half of shipboard officers have no baccalaureate degree in marine transportation or marine engineering (Coast Guard Fleet Manning Group, 2024). Instead, the current system relies on the JSOLC, an eight-week preparatory course for non-maritime officers while their fellow shipboard officers have a four-year formal maritime education. While the JSOLC provides a foundation when it comes to basic maritime knowledge, it lacks the depth of instruction that is needed for practical skills like shiphandling and marine engineering, which are both technical in nature. In addition, competency development is also hindered by JSOLC's reliance on written exams and limited practical shiphandling evolutions. The issue is further exacerbated due to the lack of studies evaluating the effectiveness of JSOLC when it comes to preparing shipboard officers for maritime duties.

Although some PCG studies have looked closely at senior leadership roles—such as Berbie's (2024) work on PCG commanding officers—very little attention has been given to junior billet officers. This is problematic because these officers are often the ones carrying out missions on the frontlines, making decisions under pressure that can determine the safety of their crews and the success of operations. Studies on education-job mismatch (Di Paolo & Mañé, 2016; Kim & Choi, 2018) provide useful insights but do not capture the unique challenges faced in the maritime-coast guard setting, where even small mistakes at the tactical level can have far-reaching consequences, especially in maritime search and rescue operations. This lack of research is significant because junior officers directly shape shipboard readiness, emergency response, and ultimately, national maritime security. To address this gap, this study examines the Junior Ship Officer Leadership Course (JSOLC), evaluates the competencies of non-maritime officers, and proposes a tailored training program to better prepare them for the demands of coast guard service at sea.

Objectives

This study aimed to assess the current non-maritime officer shipboard training program and provide practical recommendations for improvement. Specifically, it sought:

1. To identify the standard competencies required for non-maritime coast guard officers in watchkeeping duties;
2. To evaluate the JSOLC's effectiveness in terms of content, outcome, and delivery;
3. To assess the level of competence of current non-maritime officers in knowledge and understanding;
4. To propose and develop a structured competency training program for non-maritime officers to address training and competency gaps.

Methods

This study employed a mixed-method approach in order to attain the objectives of the study. The first phase employed a qualitative process of document review of relevant materials when it comes to the Coast Guard Fleet's Officer Training Program. These include the STCW competencies, the JSOLC Curriculum and other relevant training that is being received by the non-maritime officers. The second qualitative phase involved interviews with subject matter experts (SMEs) composed of four (4) PCG Commanding Officers and six (6) Merchant Marine Officers (Masters and Chief Engineers). They were purposively selected based on their skills and experience with the Commanding Officers holding at least seven (7) years of sea duty experience in maritime operations while the Merchant Marine Officers holding at least ten (10) years of sea duty experience in the maritime commercial domain. The interview aimed to gather insights on the necessary competencies for non-maritime officers as well as the best practices of the merchant marine officers when it comes to training junior officers. The third phase involved a survey of current JSOLC instructors who are the implementors of the current CG Fleet Officer Training program. Their input is crucial because they were the ones who evaluated the effectiveness of JSOLC when it comes to its content, outcome and delivery. They were also the respondents when it comes to assessing the readiness of the non-maritime officers to assume shipboard duties after JSOLC. The final phase consisted of an 80-item examination administered to forty-nine (49) out of the total population of fifty-five (55) non-maritime officers currently deployed on PCG vessels. Representing nearly 90% of the population, this sample size provided a strong and reliable basis for analysis. The exam aimed to test their knowledge and understanding of shipboard deck and engineering competencies and PCG administrative functions, all of which are critical to their current duties. The combination of the data from these methodologies formed the results of the study and its output.

Results and Discussion

There were four (4) groups of respondents in this study. They were purposively selected in order to meet the objectives to ensure a comprehensive overview of the training program, its gaps and possible recommendations to resolve the current shortcomings.

The first group was composed of four (4) JSOLC instructors from the ranks of LT to LCDR with instructor experience ranging from 12 to 26 months (see Appendix A, Table 4). Their primary task was to evaluate the JSOLC as a course in terms of content, outcome, and delivery. Instructors with longer tenure (36 months) provided long term trends in trainee performance while those with shorter experience (12 months) highlighted emerging needs in the training program. The feedback of these instructors was essential in identifying how JSOLC prepares non-maritime officers for shipboard duties and how effective they are in meeting its mandate.

The second group of respondents was composed of PCG Commanding Officers from the ranks of LCDR to CDR with sea duty experience ranging from 7-10 years (see Appendix B, Table 6). This breadth of experience is crucial because the Commanding Officers are the key movers when it comes to shipboard operations. Moreover, the respondents have various experience in different types of PCG vessels such as the 24-meter Fast Patrol Boat, 87-meter Offshore Patrol Vessel and 97-meter Multi-Role Response Vessel, thereby emphasizing their dynamic skills in coast guard shipboard operations. Their insights provided the identification

of the essential competencies needed by the non-maritime officer for watchkeeping and shipboard operations as well as the needs of the shipboard officers to improve their competencies. As leaders, their perspectives on gaps in non-maritime officers' training are invaluable for recommending program enhancements (Berbie, 2024).

The third group involved six (6) respondents from the merchant marine profession. Specifically, the group was composed of three (3) Captains and three (3) Chief Engineers with sea duty experience ranging from 10-18 years (see Appendix C, Table 7). Their inputs, just like the PCG Commanding Officers, provided insights for the best practices of the merchant marine officers when it comes to watchstanding, critical competencies and the best practices that can support the Coast Guard Fleet Officer Training Program. Their technical expertise informs recommendations for bridging gaps in non-maritime officers' skills, emphasizing STCW-aligned training (Tang & Sampson, 2017).

Finally, the last group of respondents was composed of the 49 non-maritime officers who participated in the 80-item exam which assessed their knowledge and understanding of shipboard watchstanding duties and PCG administrative functions. This group is primarily made up of junior ranks, with the majority (55%) holding the rank of CG Ensign, and a small percentage (2%) at the rank of CG Lieutenant Commander, indicating a generally youthful group with significant frontline exposure (see Appendix D, Table 5). Regarding educational background, Nursing is the most represented college major (23%), followed by Criminology (19%), Electrical Engineering (12%), and Mechanical Engineering (10%), while specialized fields like Psychology, Electronics and Communications Engineering, Diplomatic Affairs, Customs Administration, Information Management, and Medical Technology each account for only 2% of the respondents. This reflects the current requirements of the PCG which requires officers to have a baccalaureate degree with Professional Civil Service Eligibility, Professional Civil Service (PRC) License, MARINA License for Deck and Engineering Officers, Pilot License issued by the Civil Aviation Authority of the Philippines (CAAP) or other equivalent (Coast Guard Human Resources Command, 2023). This diversity of majors reflects a wide-ranging skill set among the officers, although it may highlight potential gaps in maritime-specific knowledge for certain fields.

In terms of sea duty experience, most participants (43%) have a maximum of one year at sea, including those with 1-6 months and 7-12 months of sea duty. The remaining 57% have over a year of experience, with some reaching up to 48 months. Within this group, a combined 32% have 13-24 months, or roughly two years, of experience. This distribution shows that a significant portion of the participants are in junior ranks and have limited maritime exposure, underscoring the importance of structured training to build core competencies in support of PCG functions.

Standard Competences Required for Non-Maritime Coast Guard Personnel to Perform Watchkeeping Duties

In order to determine the baseline competencies that are needed by the non-maritime officers when it comes to shipboard watchstanding and junior billet duties, this study first evaluated the current training program of the Coast Guard Fleet, which is the Junior Ship Operational Level Course or JSOLC (FETDDI, 2023). The JSOLC is an initial eight-week training program for Coast Guard Officers aspiring to become shipboard officers and is the only course needed to qualify for placement in shipboard billets in the PCG. Though PCG vessels are not subject to the STCW since they are government vessels, the JSOLC is primarily adopted from the STCW Tables A-II/1 (navigation) and A-III/1 (engineering)focusing on three functions: Function I (navigation, including passage planning, RADAR/ARPA use, emergency response, maneuvering, and visual signaling); Function II (cargo handling); and Function III (pollution prevention, seaworthiness, lifesaving, medical aid, and legislative compliance). An administrative module covers PCG vessel organization and shipboard duties.

However, the main weakness of the JSOLC is its theoretical emphasis and its short duration which limits the development of practical

shipboard skills such as shiphandling which are essential once they deployed in coast guard vessels. This finding aligns with the literature on maritime studies where practical and realistic training is found to prepare students for real life scenarios as watchstanders (Lokuketagoda et al., 2015). The following sections evaluate these competencies through commanding officers' and merchant marine experts' lenses, revealing STCW alignments and deficiencies.

Critical Competencies for Non-Maritime Officers and Their Gaps as Identified by Commanding Officers

Based on the interviews with the PCG Commanding Officers (COs), Table 8 summarizes competencies from STCW Table A-II/1 where junior billet officers are perceived as lacking. A notable finding is that Competences 1 (planning passage and position determination) and 10 (cargo monitoring) were unanimously identified as deficient (100%), highlighting challenges in navigation and cargo operations.

These skill gaps poses safety risks to PCG personnel since navigational errors account for 75% of human error-related maritime incidents (Sánchez-Beaskoetxea et al., 2021). Meanwhile, competence 2 (safe navigational watch, COLREGS and BRM) and Competence 5 (emergency response) were also found to be lacking by 75% of the COs, which is also a concern since BRM is essential in minimizing errors through proper bridge personnel coordination (Ikram et al., 2023).

On the other hand, lower deficiencies were reported in Competences 3 (RADAR/ARPA use), Competence 14 (responding to fires onboard) and Competence 4 (ECDIS use) at 25% which indicate strengths in tech-aided navigation and fire control response procedures among non-maritime officers. Competences 6, 9, 11, 15, 16, 17 and 19 (maneuvering, cargo inspection, lifesaving, medical aid and personnel safety) were also noted as lacking by 50% of COs, which suggests gaps that require targeted improvement.

Table 8. Competences That Junior Billet Officers Lack According to Commanding Officers

COMPETENCES	Commanding Officers	
	f*	%
1. Plan and conduct passage and determine position (celestial navigation, coastal, electronic, meteorology)	**4**	**100%**
2. Maintain a safe navigational watch (COLREGS, Bridge Resource Management)	3	75%
3. Use of RADAR and ARPA to maintain safety of navigation	**1**	**25%**
4. Use of ECDIS to maintain the safety of navigation	**1**	**25%**
5. Respond to Emergencies (emergency procedures)	3	75%
6. Respond to a distress signal at sea	2	50%
7. Use of the IMO Standard Marine Comms Phrases in English in both written and oral form	3	75%
8. Transmit and receive information by visual signaling	3	75%
9. Maneuver the ship	2	50%
10. Monitor the loading, stowage, securing, care during the voyage and unloading of cargoes	**4**	**100%**
11. Inspect and report defects and damage to cargo spaces, hatch covers and ballast tanks	2	50%
12. Ensure compliance with pollution prevention requirements	2	50%
13. Maintain seaworthiness of the ship	3	75%

COMPETENCES	Commanding Officers	
	f*	%
14. Prevent, control and fight fires on board	**1**	**25%**
15. Operate lifesaving appliances	2	50%
16. Apply Medical first aid on board ship	2	50%
17. Monitor compliance with legislative requirements	2	50%
18. Application of leadership and teamworking skills	3	75%
19. Contribute to the safety of personnel and the ship	2	50%

These findings by the COs highlight that the lack of maritime collegiate education of the non-maritime officers exacerbates the gaps when it comes to technical proficiency such as navigation, ship handling and cargo handling. Considering that navigation and cargo handling are tasks that are regularly performed by personnel onboard ships, the lack of proficiency on these areas poses safety risks since routine tasks require technical competence and leadership precision (Berbie, 2024). In addition, BRM training must also be incorporated since reducing deficiencies requires enhanced crew coordination as well (Ikram et al, 2023).

Challenges and Recommendations in Bridging Competency Gaps for Non-Maritime Coast Guard Personnel

The interviews with the four COs revealed two primary challenges: inadequate training structures and educational background mismatches. For example, CO1 noted that an "inadequate training portfolio" and "unprogrammed course content" were significant factors limiting officers' competency. CO3 echoed these concerns, pointing to a "lack of competent instructors, incomplete training materials and facilities, and improper execution of refresher training" as major obstacles. These responses underline the need for a more structured and comprehensive training approach that addresses current resource gaps.

The second issue, which is the lack of maritime background of some junior officers was emphasized by COs 2 and 4. CO 2 attributed gaps in proficiency to the "educational background" of these personnel, while CO 4 elaborated on this point by explaining that "not all officers being assigned aboard ships have a common maritime-related educational background." CO 4 further noted that junior officers without such background struggle to match the performance level of their maritime-trained peers during the early stages of their shipboard careers.

In response to another question, which was focused on potential strategies to enhance junior officers' proficiency, the Commanding Officers offered various suggestions. A key recommendation from CO1 was to implement a "Junior Billet Officer Shipboard training curriculum policy to enhance Shipboard Training Program for Officer Watchstanders," which emphasizes the need for a formal shipboard training program. CO2 reinforced this by advocating for a "shipboard training program for watchstanding once an officer is aboard ship." These responses indicate a consensus on the importance of systematic, practical shipboard experience to solidify officers' watchkeeping competencies.

Additionally, CO3 emphasized the importance of selecting "competent and experienced instructors," revising the "program of instructions," improving training facilities, and implementing a "comprehensive qualification exam prior to assignment onboard." This response suggests that improvements to both the instructional quality and the physical training environment could play a pivotal role in developing more capable watchstanders. CO4 proposed a more focused, technical shipboard training program, especially for junior officers without maritime background. This recommendation underlines the need for tailored training solutions that address the unique

challenges faced by non-maritime officers. This observation is further echoed by Berbie (2024) in his study of PCG Commanding Officers in which he concluded that continuous professional development initiatives and training are necessary in order to complement the diverse backgrounds of coast guard officers in the shipboard operations.

Essential Practical Competences for Watchkeeping Duties as Identified by Ship Captains and Chief Engineers

Table 9 outlines practical competencies deemed vital by the six ship captains and chief engineers, with Competences 1 (planning passage and position determination), 2 (maintaining a safe navigational watch, including COLREGS and BRM), and 4 (using ECDIS) unanimously rated as essential (100%). The competencies form the backbone of navigation skills which include celestial, coastal and electronic navigation, meteorological assessments, COLREGS, BRM and the use of ECDIS.

Table 9. Practical Competences Vital to Perform Watchkeeping Duties According to Ship Captains and Chief Engineers

COMPETENCES	Captains and Chief Engineers	
	f*	%
1. Plan and conduct passage and determine position (celestial navigation, coastal, electronic, meteorology)	**6**	**100%**
2. Maintain a safe navigational watch (COLREGS, Bridge Resource Management)	**6**	**100%**
3. Use of RADAR and ARPA to maintain safety of navigation	5	83%
4. Use of ECDIS to maintain the safety of navigation	**6**	**100%**
5. Respond to Emergencies (emergency procedures)	3	50%
6. Respond to a distress signal at sea	3	50%
7. Use of the IMO Standard Marine Comms Phrases in English in both written and oral form	4	67%
8. Transmit and receive information by visual signaling	2	33%
9. Maneuver the ship	5	83%
10. Monitor the loading, stowage, securing, care during the voyage and unloading of cargoes	**1**	**17%**
11. Inspect and report defects and damage to cargo spaces, hatch covers and ballast tanks	3	50%
12. Ensure compliance with pollution prevention requirements	3	50%
13. Maintain seaworthiness of the ship	3	50%
14. Prevent, control and fight fires on board	2	33%
15. Operate lifesaving appliances	3	50%
16. Apply Medical first aid on board ship	2	33%
17. Monitor compliance with legislative requirements	2	33%
18. Application of leadership and teamworking skills	3	50%
19. Contribute to the safety of personnel and the ship	4	67%

Conversely, Competence 10, which involves monitoring cargo handling and care during voyages, was rated the least vital, with only 17% of respondents identifying it as essential

for non-maritime Coast Guard watchkeeping roles. While the PCG does cargo handling, it is not as comprehensive as those being done in the commercial maritime context. In addition, a common alignment when it comes to the importance of proficient watchkeeping arises where both PCG Commanding Officers and Merchant Marine Officers agreed that it is crucial to have proficient watchstanders on board PCG vessels because it improves other areas such as ship safety and emergency response skills. The connection between proficient watchkeeping and safety is also echoed by Berg (2013) in which he found that competence in skills like navigation fosters a safety culture on commercial vessels, which are critical since ship personnel have to rely on each other to ensure the safety of the ship and personnel. A similar study by Tang and Sampson (2017) found a significant correlation between a seafarer's perceived benefits of training, such as practical exercises and his level of motivation in the learning process.

Essential Competencies for Non-Maritime Officer Watchstanders

Through the analysis of the data from JSOLC training program as well as the interviews from merchant marine officers, the competencies that are appropriate for non-maritime officers were identified as the following, which reflect the needs of the Coast Guard Fleet and are based on the STCW's Table A-II/1 and Table A-III/1. It is important to note given that the merchant officers and Coast Guard officers have differences in their roles and operating environment, these competencies reflect the insights that are applicable for non-maritime officers exclusively. For Deck watchkeeping (Table A-II/1), the standard competencies include the planning and conducting passage and determining position, maintaining a safe navigational watch, using radar and ARPA, responding to emergencies, maneuvering the ship, the use of ECDIS for safe navigation, responding to a distress signal at sea, employing standard marine communication phrases, transmitting information via visual signaling, maneuvering the

ship, monitoring the loading and stowage of cargoes, ensuring compliances with pollution prevention requirements, maintaining the seaworthiness of the ship, preventing and fighting fires on board, operating lifesaving appliances, applying medical first aid, compliance with other legislative requirements, application of leadership and teamwork skills and contributing to the safety of personnel and the ship (IMO, 2010). Meanwhile, for engine watchkeeping or Table A-III/1, the competencies are maintaining a safe engineering watch and operating main, auxiliary, and associated systems (IMO, 2010). In addition to these, PCG competencies that are relevant are also identified as organizational roles and coordination, administrative and communication skills, ship safety and gunnery.

JSOLC Instructors' Evaluation of Juniorship Operational Level Course

Since JSOLC is the current prerequisite course for all PCG officers aspiring to shipboard junior billets, a survey was administered to four Juniorship Operational Level Course (JSOLC) instructors to evaluate the course in terms of Content, Delivery, and Outcome. The instructors' assessments provide valuable insights into the course's effectiveness and identify areas for potential improvement to better meet training objectives for junior billet officers.

Content

In evaluating the Juniorship Operational Level Course (JSOLC) in terms of content, the responses from JSOLC instructors indicate areas of both strength and potential improvement. As presented in Table 12, the content-related aspect with the highest rating is the relevance of the readings to the course and necessary skills for Junior Billet Officers, with a weighted mean of 3.75, interpreted as "Strongly Agree." This suggests that the course readings are well-aligned with the knowledge and skills critical to the roles that Junior Billet Officers will perform, a positive indication of the course's alignment with operational needs.

Table 12. Assessment of JSOLC in terms of Content

INDICATORS	WM	VI
1. The readings are relevant to the course and skills that are needed for Junior Billet Officers.	3.75	*SA*
2. The graded assignments helped the students understand the course material.	3.50	*SA*
3. The exams and assignments are reflective of the course content.	3.50	*SA*
4. The lectures are relevant to the course and skills that are needed for Junior Billet Officers.	3.25	*A*
5. The course is organized in such a way that it help students understand key concepts.	3.25	*A*
6. The course is well organized considering the skill level of the students.	2.75	*A*
7. The instructional materials such as readings, books and handouts increased the students' knowledge and skills.	2.75	*A*
8. The course provides a good balance of theory and practice.	2.50	*A*
OVERALL WEIGHTED MEAN	**3.16**	***A***

Legend: 3.50 – 4.00 — Strongly Agree (SA); 2.50 – 3.49 — Agree (A); 1.50 – 2.49 — Disagree (D); 1.00 – 1.49 —Strongly Disagree (SD); WM – Weighted Mean; VI – Verbal Interpretation

Similarly, the graded assignments and exams were rated at 3.50, which narrowly falls within the "Strongly Agree" range, may still imply that these assessments are perceived to effectively reinforce course material and reflect the curriculum's goals. This indicates that the instructors may find these components valuable in reinforcing students' understanding of essential competencies.

On the other end, the aspect with the lowest rating is the course's balance of theory and practice, with a weighted mean of 2.50, suggesting only an "Agree" rating. This result highlights a potential gap in integrating practical applications alongside theoretical knowledge, which could be an area to address in future course adjustments to ensure Junior Billet Officers are better prepared for real-world situations. Additionally, ratings of 2.75 were given to both the course organization, considering the students' skill level, and the impact of instructional materials like readings and handouts on knowledge and skill development. This indicates that there is some room for improvement in how course materials and structure are adapted to student needs and effectiveness in enhancing practical skills.

The overall weighted mean of 3.16, interpreted as "Agree," reflects a moderate level of satisfaction with the course content overall, though it suggests there is a need for enhancements, especially in practical application, to fully meet the competency requirements for Junior Billet Officers. This evaluation underlines the importance of further refining the curriculum to strengthen the balance between theoretical and practical components and to ensure that organizational aspects align with student skill levels and learning needs.

Delivery

In terms of delivery, the feedback from JSOLC instructors suggests that while the course meets a satisfactory standard, there are areas that may benefit from enhancement. As shown in Table 13, the highest-rated aspects of delivery are adherence to the program of instruction and the use of both online and face-to-face teaching modalities to achieve course objectives, each receiving a weighted mean of 3.00, interpreted as "Agree." This indicates that the course is generally effective in following the planned instructional framework and in providing blended learning, which is beneficial for reaching a wide range of learning outcomes.

Table 13. Assessment of JSOLC in terms of Delivery

INDICATORS	WM	VI
1. The course strictly follows the program of instruction.	3.00	*A*
2. The teaching of the course use both online and face to face instruction to achieve the desired objective.	3.00	*A*
3. The sequence of learning activities complemented and are built upon each other.	2.75	*A*
4. The course offers clear instructions and explanations for the topics	2.75	*A*
5. There are one-on-one coaching for the students that are struggling through the course.	2.50	*A*
OVERALL WEIGHTED MEAN	**2.80**	***A***

Legend: 3.50 – 4.00 — Strongly Agree (SA); 2.50 – 3.49 — Agree (A); 1.50 – 2.49 — Disagree (D); 1.00 – 1.49 —Strongly Disagree (SD); WM – Weighted Mean; VI – Verbal Interpretation

Conversely, the lowest-rated indicator is the provision of one-on-one coaching for students facing challenges, which received a weighted mean of 2.50, also interpreted as "Agree." This lower rating highlights an area of concern, suggesting that individualized support for struggling students may be insufficient, which could affect these students' mastery of essential competencies.

The overall weighted mean of 2.80 reflects a general "Agree" rating, pointing to a delivery approach that is adequately structured but with room for adjustments to improve student support and the progression of learning activities. These findings suggest that more focused coaching and a stronger emphasis on building progressive, interconnected activities could enhance course delivery, better ensuring that all Junior Billet Officers develop the intended competencies.

Outcome

In terms of the course's outcomes, the JSOLC instructors provided an overall assessment that reflects moderate agreement on the course's effectiveness in achieving its intended objectives. As detailed in Table 14, the indicators with the highest weighted mean are the consistent achievement of learning outcomes for each module, the exams' ability to accurately measure knowledge gained, and the provision of skills required for watchstanding duties on PCG vessels, each with a weighted mean of 3.00, interpreted as "Agree." These ratings suggest that the course is generally successful in delivering knowledge and skills pertinent to Junior Billet Officers' on-board duties and that its exams serve as reliable assessments of these competencies.

Table 14. Assessment of JSOLC in terms of Outcome

INDICATORS	WM	VI
1. The learning outcomes for each module is achieved consistently.	3.00	*A*
2. The exams accurately measured the knowledge that is gained from JSOLC.	3.00	*A*
3. The course provides the students the skills that are required to perform as watchstanders on board PCG vessels.	3.00	*A*
4. After the final assessment, the students had all the knowledge needed to perform well as junior billet officers.	2.75	*A*
OVERALL WEIGHTED MEAN	**2.94**	***A***

Legend: 3.50 – 4.00 — Strongly Agree (SA); 2.50 – 3.49 — Agree (A); 1.50 – 2.49 — Disagree (D); 1.00 – 1.49 —Strongly Disagree (SD); WM – Weighted Mean; VI – Verbal Interpretation

The lowest-rated indicator is the final assessment of students' readiness for junior billet officer roles, with a weighted mean of 2.75, also interpreted as "Agree." This slightly lower

rating implies that there may be gaps in ensuring students feel fully prepared to perform at the desired competency level upon course completion. This may point to the need for more comprehensive final assessments or additional training components to further solidify students' capabilities.

The course weighted mean of 2.94 on Outcome reflects a general level of agreement on the course's positive impact, yet also hints at room for refining its structure to ensure that students consistently achieve high readiness for their roles.

The overall assessment of JSOLC highlights its strengths in aligning theoretically with mandated competencies under the STCW. In addition, in terms of content, its learning materials and readings were rated as consistent with the learning objectives of the course in terms of navigation, cargo handling, engineering and PCG administrative roles. In terms of delivery, it is moderately effective as indicated by the instructors' comments on the use blended learning and its adherence to the program of instruction. In terms of outcome, it provides mixed results with skills like safety and medical first aid taught consistently but the overall practical readiness is lacking.

The said evaluation also reveals notable gaps in the course, especially in terms of the proper balance of theory and practice during the course duration. One notable weakness is its short duration which is eight weeks which means there is no in-depth learning allocated for practical exercises like shiphandling, engineering, firefighting and use of Radar and EC-DIS. There was also a lack of focus on supplemental modules like cargo handling, which is also a common mission by PCG vessels considering that the Philippines is an archipelagic country. The eight-week window constrains the proper delivery of course's objectives which affects the practical portion of the course. Lastly, the post assessment reveals a lack of practical readiness for the non-maritime officers to assume shipboard officer roles. This means that there is room for improvement when it comes to the operational competency

and in-depth practical learning in order to prepare the non-maritime officers for their roles as department heads and watchstanders. These comments by the JSOLC instructors also echo the previous assessment by PCG commanding officers in which they also agreed that there is an inadequacy of training and the lack of maritime background affects the readiness of non-maritime officers to assume shipboard roles. Moreover, these gaps also highlight one recommendation of the PCG Commanding Officers in which they recommended a structured training program to address the weaknesses of non-maritime officers.

These results highlight that while the course outcomes are largely met, enhancing final assessments, balancing theory, practical knowledge application and tailoring additional one on one support could better equip students for the responsibilities required of Junior Billet Officers in the Coast Guard and this would enhance readiness for shipboard roles. This connection between level of training and competence level is also evident in a 2024 study of Coast Guard Commander Ailene Abanilla on the Competencies of Coast Guard Personnel in Maritime Law Enforcement in which she found a strong correlation between those two factors (Abanilla, 2024).

Level of Competence of the Current Non-Maritime Junior Billet Officers

The final phase and final group of respondents of this study consisted of an 80-item knowledge and understanding exam for 49 non-maritime officers who are currently serving as junior billet officers onboard PCG vessels. This phase was critical because these officers, mostly from the ranks of ENS-LCDR, are the main beneficiaries of this study. The 80-item exam assessed their current level of knowledge and understanding on shipboard watchstanding and coast guard administrative duties. Through this exam and previous groups of respondents, conclusions were derived to propose recommendations on the enhancement of the current Coast Guard Fleet Officer Training Program.

Table 15. Competence Level of Current Non-Maritime Junior Billet Officers in terms of Knowledge and Understanding

QUESTIONS	Question Type	% Correct	Competence Level
1. What is the position obtained by applying only your vessel's course and speed to a known position?	Knowledge	73%	*Proficient*
2. What is the position obtained by applying estimated current and wind to your vessel's course and speed?	Knowledge	73%	*Proficient*
3. Your vessel's heading is 330°pgc and 345°psc with a 2°E gyro error. If there is a variation of 10°W, what is the deviation on this heading?	Understanding	51%	*Competent*
4. When relieving the helm, the new helmsman should know the ___.	Understanding	69%	*Proficient*
5. What is a common occurrence when a vessel is running into a shallow water?	Knowledge	39%	*Advanced Beginner*
6. A one knot current has approximately the same effect on a given surface area as a:	Knowledge	71%	*Proficient*
7. If your vessel is dragging her anchor in a strong wind, you should:	Understanding	71%	*Proficient*
8. The actual speed of the vessel over the surface of the earth at any given time.	Knowledge	**96%**	***Expert***
9. After sailing for several minutes (making 10 knots through the water) and in constant monitoring of your radar screen, you noticed that a contact has remained in the same position relative to yours, what could be the possible conclusion of the scenario?	Understanding	**69%**	***Proficient***
10. Which statement is NOT correct regarding the gyro compass?	Understanding	**8%**	***Novice***
11. Which term refers to the direction a current is flowing?	Knowledge	33%	*Advanced Beginner*
12. What is the definition of height of tide?	Knowledge	47%	*Competent*
13. Which information must automatic identification systems (AIS) automatically provide to appropriately equipped shore stations, vessels and aircraft?	Knowledge	65%	*Proficient*
14. A running fix is a position obtained by ___?	Understanding	45%	*Competent*
15. An automatic identification system (AIS) transponder transmits and receives information broadcasts on:	Knowledge	69%	*Proficient*
16. You are on watch at night in clear visibility and the vessel has just been anchored.	Understanding	39%	*Advanced Beginner*

QUESTIONS	Question Type	% Correct	Competence Level
The first thing that you should do after the anchor has been let go is to ___.			
17. For the deepest water when negotiationg a bend in a river, you should always navigate your vessel ___.	Understanding	29%	*Advanced Beginner*
18. IN REGION A of the IALA Buoyage System, when entering from seaward, the starboard side of a channel would be marked by a ___.	Understanding	41%	*Competent*
19. At 0000 you fix your position and plot a new DR track line. At 0200 you again fix your position and it is 0.5 mile east of your DR. Which statement is TRUE?	Understanding	45%	*Competent*
20. Which vessel would NOT sound a fog signal of one prolonged and two short blasts?	Knowledge	49%	*Competent*
21. Your vessel is backing out of a slip in a harbor. Visibility is restricted. You should sound ___.	Understanding	37%	*Advanced Beginner*
22. You are in sight of a power-driven vessel that sounds two short blasts of the whistle. This signal means that ___.	Understanding	41%	*Competent*
23. Which signal is sounded ONLY by a vessel in sight of another and NOT in or near an area of restricted visibility?	Knowledge	51%	*Competent*
24. Which signal is required to be sounded by a power-driven vessel ONLY?	Understanding	29%	*Advanced Beginner*
25. Vessel "X" is overtaking vessel "Y" on open waters and will pass without changing course. Vessel "X" ___.	Understanding	45%	*Competent*
26. When two vessels are in sight of one another and NOT in or near an area of restricted visibility, any of the following signals may be given EXCEPT ___.	Understanding	27%	*Advanced Beginner*
27. What whistle signal, if any, would be sounded when two vessels are meeting, but will pass clear starboard to starboard?	Understanding	39%	*Advanced Beginner*
28. What is the minimum sound signaling equipment required aboard a vessel 10-meters in length?	Knowledge	31%	*Advanced Beginner*
29. For a vessel constrained by its draught, describe the day signal with its corresponding size.	Knowledge	35%	*Advanced Beginner*

QUESTIONS	Question Type	% Correct	Competence Level
30. Whenever a course alteration is made to avoid collision, it should be:	Understanding	33%	*Advanced Beginner*
31. Which statement is TRUE regarding equipment for bell and gong signals?	Understanding	41%	*Competent*
32. A 95-meter vessel aground shall sound which fog signal?	Knowledge	59%	*Competent*
33. You are underway on a power driven vessel in open water when you observe a crossing power driven vessel approximately 8 miles away at 22 degrees on your port bow. Bearing steady, what action do you take?	Understanding	**65%**	***Proficient***
34. COLREGS shall apply to which of the following vessels?	Understanding	73%	*Proficient*
35. A vessel is deemed to be in what situation when she approaches another vessel from more than 22.5 degrees abaft other vessel's beam?	Knowledge	**65%**	***Proficient***
36. When the range of the target is decreasing and the bearing remains constant, the ships are on:	Understanding	**82%**	***Expert***
37. The vessels engaged in fishing with purse seine gears may exhibit two yellow lights in a vertical line. These lights shall flash alternately every second and wit equal light and occultation duration. These lights may be exhibited only when the vessel is:	Understanding	78%	*Proficient*
38. In order for a stand-on vessel to take action in a situation, she must first determine that the other vessel:	Understanding	37%	*Advanced Beginner*
39. A power-driven vessel is underway and fishing with trolling lines. This vessel:	Knowledge	39%	*Advanced Beginner*
40. Your vessel is proceeding along a narrow channel displaying the signal required by the rule 28. A small vessel commences to cross the channel from starboard to port. It appears that she will impede your passage. What signal should you give under the circumstances?	Understanding	35%	*Advanced Beginner*
41. Fog signals, required under the Rules for vessel underway, shall be sounded:	Knowledge	67%	*Proficient*
42. In fog, you observe your radar and determine that a risk of collision exist with a	Understanding	43%	*Competent*

QUESTIONS	Question Type	% Correct	Competence Level
vessel 2 miles off your port bow. You should:			
43. As a stand-on vessel in a crossing situation, you may hold your course and speed until:	Understanding	59%	*Competent*
44. What lights may be shown by a vessel of 100 meters or more that is at anchor?	Knowledge	57%	*Competent*
45. A power-driven vessel not under command at night must show her sidelights when ___.	Knowledge	45%	*Competent*
46. Under COLREGS Annex IV, what does the orange flag, showing a black circle and a square shape indicate?	Understanding	65%	*Proficient*
47. A 25-meter vessel trawling will show the dayshape(s) consisting of ___.	Knowledge	47%	*Competent*
48. A vessel engaged in trawling will show identification lights of ___.	Knowledge	71%	*Proficient*
49. At night which lights would you see on a vessel engaged in fishing other than trawling?	Knowledge	59%	*Competent*
50. An execution by swinging out of the ship with maximum wheel either port or starboard, and subsequently reverse the wheel so that them ships head swings out to, but not beyond 60 from the original course, then continue to swing back with full wheel.	Understanding	67%	*Proficient*
51. A pumproom is suspected of accumulating gases after a ventilation machinery breakdown. Where should the combustible gas indicator case be placed when testing the pumproom atmosphere for combustible gases?	Understanding	24%	*Advanced Beginner*
52. The patches where rust have been removed should be wiped clean before paint is ___.	Understanding	**92%**	***Expert***
53. What should you do FIRST to correct a condition wherein a diesel engine is operating with excessively high exhaust temperature on all cylinders?	Understanding	53%	*Competent*
54. The fundamental difference between a 2-stroke and a 4-stroke engine is in the number of ___.	Knowledge	**16%**	***Novice***
55. Your vessel is entering a tropical area and high humidity is expected what should	Understanding	**18%**	***Novice***

QUESTIONS	Question Type	% Correct	Competence Level
you do to avoid condensation in the main engine s air cooler ?			
56. When the opening pressure of a diesel fuel injector is LOWER THAN that specified by the engine manufacturer the effect would be a/an ___.	Understanding	**16%**	***Novice***
57. Engine room bilge water can be pumped out overboard safely by the use of which equipment listed below?	Understanding	**84%**	***Expert***
58. Which of the following kind of tank is being used onboard that collects the dirty water from basins and sinks when the vessel is in port so that water pollution can be prevented?	Understanding	55%	*Competent*
59. It is necessary to transfer fuel oil to the settling tanks in order to ___.	Understanding	57%	*Competent*
60. A ship travels is 5472 miles in 26 days 2 hours and 24 minutes. Find the average speed for the engine voyage.	Understanding	47%	*Competent*
61. While riding at anchor, the anchor chain should be secured by the ___.	Understanding	73%	*Proficient*
62. While inspecting the steering gear at sea, you should check for ___.	Understanding	37%	*Advanced Beginner*
63. If two compressors must be operated in parallel in order to maintain the box temperatures, a careful watch should be kept on the ___.	Understanding	33%	*Advanced Beginner*
64. An engine fails to start even if all temperatures and pressures are normal because ___.	Understanding	51%	*Competent*
65. If the fire ignites in the engine room as a result of a high pressure fuel oil leak, you should first ___.	Understanding	**71%**	***Proficient***
66. A lube oil filter can be used to remove most contaminants from lube oil. What contaminant will remain in the lube oil after filtering?	Understanding	31%	*Advanced Beginner*
67. Operating a diesel engine for prolonged period at temperature lower than the normal design temperature may cause ___.	Understanding	39%	*Advanced Beginner*
68. Some diesel engine are fitted with a thermometer in the cooling water outlet from	Understanding	22%	*Advanced Beginner*

QUESTIONS	Question Type	% Correct	Competence Level
each cylinder. If the cooling water temperature from cylinders begins to rise above normal, you should supect ___.			
69. Which of these will have the greatest lasting effect on the crew with respect to safety?	Understanding	**82%**	***Expert***
70. Underway on watch in the fireroom, the bridge reports black smoke coming from the stack. This would indicate ___.	Understanding	**14%**	***Novice***
71. Which department on board a PCG vessel is responsible for the collection, evaluation and dissemination of operational information required for the assigned missions and tasks of the ship?	Knowledge	**92%**	***Expert***
72. What area on board a ship houses the officers' staterooms and wardroom?	Knowledge	**94%**	***Expert***
73. Which department on board a PCG vessel is responsible for the operation, care and maintenance of all propulsion and auxillary machinery, establishing and maintaining an effective damage control organization, the supervision and conduct of repairs.	Knowledge	**98%**	***Expert***
74. What area on the ship is designated by the Commanding Officer as place for official and ceremonial functions?	Knowledge	**94%**	***Expert***
75. Which officer is responsible for the operational readiness and maintenance of all ground tackle and equipment relative to anchoring and mooring such as anchors, anchor windlass, anchor cables or chains, detachable links etc.	Knowledge	**94%**	***Expert***
76. During the watch, who is designated by the engineering officer to be in charge of the engineering plant and auxillaries	Knowledge	**100%**	***Expert***
77. What are accepted practices realized through continued usage that take the force and effect of a common law?	Knowledge	71%	*Proficient*
78. Who is the enlisted personnel on watch designated by the operations officer to perform QM and signalman duties	Knowledge	**100%**	***Expert***
79. What are inherited principles, standards and practices that serve as guide for individuals or groups. Traditions are accumulated practices, experiences and	Knowledge	69%	*Proficient*

QUESTIONS	Question Type	% Correct	Competence Level
deeds passed on from generation to generation?			
80. What does it mean that whenever a choice is to be made, such a selection of billets or quarters, electing means of transportation, or other privileges, the option of selection follows rank, with the senior given the privilege to select first?	Knowledge	**96%**	***Expert***
OVERALL AVERAGE		**55%**	

Legend: 81% – 100% — Expert; 61% – 80% — Proficient; 41% – 60% —Competent; 21% – 40% — Advanced Beginner; 0% – 20% — Novice

Knowledge

In the knowledge section of the exam, the highest levels of knowledge were demonstrated in Questions 76 and 78, where officers achieved a 100% score. In Question 76, officers correctly identified the personnel responsible for overseeing the engineering plant and auxiliaries during watch, reflecting a thorough understanding of engineering oversight—a critical skill for operational readiness. Similarly, in Question 78, officers accurately identified the enlisted personnel responsible for performing quartermaster and signalman duties, underscoring strong familiarity with roles and responsibilities crucial for effective shipboard operations. Other questions in the "Expert" category, such as Questions 35, 71, 72, 73, 74, and 80, also received exceptionally high scores, with 92-98% of officers demonstrating expertise in organizational structure, role assignments, and rank protocols. For example, 98% of officers correctly identified the department responsible for the maintenance and operation of propulsion machinery (Question 73), while 96% accurately understood the principle of rank privilege selection (Question 80). These high scores collectively indicate a robust grasp of operational protocols and Coast Guard traditions—essential for effective ship coordination and role-specific responsibilities.

On the other hand, the lowest level of competence appeared in Question 54, where only 16% of officers demonstrated knowledge about the fundamental difference between two-stroke and four-stroke engines, placing this item at the "Novice" level. This gap suggests a need for focused training in engine mechanics, which is critical for ensuring equipment maintenance and operability. Additional areas categorized as "Advanced Beginner," such as Questions 5, 28, and 39, which are Rules of the Road (ROTR) or Collision Regulations (COLREGS) questions with scores ranging from 31% to 39%, indicate moderate knowledge in basic maritime skills. These results reveal that while officers have foundational knowledge in fundamental maritime procedures, there are areas—particularly in technical competencies like sound signals and fog signal recognition— where improvement is needed.

One factor to consider is that questions like the difference between a two-stroke and four-stroke engine and COLREGS are very technical in nature. These are concepts that are exclusive only for marine engineering and marine transportation students, which explains why only 16% of the non-maritime officers have answered them correctly. In support of this, another explanation that explains this is the concept of education-job match. Di Paolo and Mañe (2016) defined it as the alignment of a person's educational background with the skill requirement of the current job that he is in. In this particular case, the relationship of a maritime college degree to the shipboard jobs of a coast guard officer. Moreover, in the same study, the said researchers found that if a person's educational background matched his job role, that person tends to have higher job performance and higher productivity (Di Paolo and Mañe, 2016). This tends to happen because an officer leans on what he had studied and having a deep

and thorough education on technical maritime concepts helps him in the performance of shipboard duties. Another study by Yussoff and Suleiman (2025) and Sandulli et al. (2014) also came to the same conclusion that education mismatch led to lower levels of productivity and even lower wages because they tend to struggle in the performance of the job if the education is not aligned with work requirements.

Understanding

Under the Understanding Section, it reveals notable variations across specific items, with some areas demonstrating high expertise and others indicating gaps.

The competence level is strong in items where officers achieved an "Expert" rating. For instance, item 52, which addresses correct procedures for rust removal before painting, achieved the highest score at 92%. This suggests a strong grasp among officers regarding maintenance protocols that prevent structural deterioration. Additionally, officers scored 84% on item 57, which involves safe procedures for pumping engine room bilge water overboard, reflecting high competence in pollution prevention—a critical aspect of maritime environmental compliance. Other items where officers were rated as "Expert" include item 36 (82%) and item 69 (82%), concerning collision avoidance and safety protocols, respectively. These high scores indicate that officers are well-prepared in operational and safety-related competencies, crucial in maritime settings.

Meanwhile, a level of proficiency was observed in item 65, where 71% of officers correctly identified the appropriate immediate action in response to a fire caused by a high-pressure fuel oil leak in the engine room. This result highlights a strong understanding of critical emergency response procedures, which is essential for safety in high-risk operational settings. Other items reaching the "Proficient" level include items 9, and 33 with 69% and 65% correct responses, respectively. Item 9, which assessed officers' awareness of potential collision risks when observing a stationary radar contact, saw the second-highest proficiency. Similarly, item 33 evaluated appropriate action in a crossing situation. The officers'

performance in these scenarios reflects solid command over essential navigational protocols in open water, vital for maintaining safety in various maritime contexts.

Conversely, the data shows significant room for improvement, as seen in items where officers only demonstrated a "Novice" level of understanding. Item 10, which covers fundamental knowledge about the gyro compass, recorded the lowest score at just 8%. This result indicates a potential knowledge gap in navigation-related concepts, which are essential for effective maritime operations. Low scores in such foundational areas underscore the need for focused training to build a more robust understanding of basic navigation tools among these officers.

Further findings reveal other areas where officers are only at an "Advanced Beginner" level, highlighting additional training needs. For example, item 17, regarding navigation strategies in river bends, scored just 29%, and item 30, related to course alterations to avoid collisions, also scored low at 33%. Similarly, items 62 and 63, which deal with steering gear inspection and compressor operation, respectively, scored below 40%, suggesting limited proficiency in technical and navigational equipment management.

In addition, areas of difficulty are evident, with scores in items classified as "Novice." Only 14% of officers correctly answered item 70, which focused on diagnosing the presence of black smoke from the stack as an indicator of a potential engine malfunction. This result, alongside low scores in item 56 (16%) regarding the effects of reduced opening pressure in a diesel fuel injector and item 55 (18%) about preventing condensation in the main engine air cooler, suggests significant knowledge gaps in engine operation and maintenance in high-humidity tropical conditions. These items highlight critical weaknesses in technical areas that require specific procedural knowledge, pointing to the need for enhanced training on engine troubleshooting and equipment adaptation to environmental factors.

Additional items, including items 16 and 40, received "Advanced Beginner" ratings with correct response rates of 39% and 35%, re-

spectively. These items involved post-anchoring procedures and signaling requirements in narrow channels, reflecting only a basic level of understanding. Such results underscore that while officers are capable of handling certain fundamental tasks, their proficiency does not extend to more nuanced operational scenarios.

These findings indicate that while current proficiency levels are adequate for foundational tasks, a structured training program focusing on advanced navigation, emergency response, and technical knowledge would be highly beneficial in addressing identified areas of weakness and improving overall competence.

The areas of weaknesses such as those that are graded as novice like the connection of black smoke and engine malfunction the proper pressure in the diesel fuel injector can be potentially explained by the educational mismatch of the non-maritime officers to the skills that are needed to perform as watchstanders onboard PCG vessels. For example, a criminology graduate who became a coast guard shipboard officer would have a steeper curve when it comes to attaining the competencies that are required by the Coast Guard Fleet. Moreover, this is supported by a 2021 study at the Wuhan University of China in which they found negative consequences for productivity, career progression and social welfare if a worker suffers a mismatch between the job and educational background (Tan and Wang, 2021). Another study that also confirmed this is a study by Kim and Choi (2018) in which they found that that doctoral level researchers of the Institute of Science and Technology in Korea who had mismatch on education and their jobs or job fit resulted negatively in terms of pay, job satisfaction and performance. In the same token, a non-maritime officer would have a difficulty grasping concepts that are related to his previous area of study.

Common Themes in Stakeholder Views on Competency Gaps and Training Enhancements

Across the perspectives of PCG Commanding Officers (COs), Merchant Marine Officers, JSOLC Instructors, and the results from the 80-item exam administered to 49 non-maritime officers, a consistent pattern emerges of strengths in coast guard administrative knowledge contrasted with significant deficiencies in technical and practical maritime shipboard skills. COs unanimously identified gaps in STCW competencies like passage planning and position determination (100% deficiency) and cargo monitoring (100%), attributing these to educational mismatches where lack of collegiate maritime background hinders proficiency in navigation and emergency response procedures (75% deficiency in safe navigational watch and emergencies). Merchant Marine Officers further reinforced this by prioritizing navigation skills like COLREGS and Bridge Resource Management (BRM) as essential, while de-emphasizing cargo handling, reflecting the PCG's non-commercial focus but underscoring the need for practical watchkeeping skills. JSOLC Instructors rated the course highly for content relevance but critiqued its eight-week duration and limited practical assessments, which fail to translate theory into actionable skills. The exam, with a 55% average validated these insights, showing strengths in PCG administrative protocols, but weaknesses in navigation (skills such as gyrocompass and COLREGS), and marine engineering (skills such as engine mechanics, black smoke diagnosis), highlighting how diverse educational backgrounds without maritime components limit technical proficiency (Di Paolo & Mañé, 2016; Kim & Choi, 2018).

A central theme across all groups of respondents is the detrimental impact of educational mismatch, which creates steeper learning curves for non-maritime officers and necessitates a targeted training to address the theoretical and operational gaps. COs noted that non-maritime officers struggle compared to maritime-educated peers, a view echoed by merchant marine officers who advocated for best practices like onboard mentoring, simulators, and audits to foster motivation and safety culture (Tang & Sampson, 2017). Instructors highlighted JSOLC's reliance on lectures which limit skill development in areas like shiphandling and engineering. The 80 item exam results further highlight this mismatch, with low scores in technical areas such a marine engineering and navigation, aligning with studies

showing that misalignment between education and job requirements reduces productivity (Tan & Wang, 2021; Yussoff & Sulaiman, 2025). Moreover, Berbie (2024) suggests that COs' heavy administrative and operational workloads leave little time for skill development for junior officers, reducing exposure to critical skills like navigation, COLREGS, and marine engineering. This systemic issue where strength in coast guard administrative protocols coexist with lack of technical competency in areas such as navigation and marine engineering underscores the need for a tailored training program to address these gaps.

Collectively, the above findings of the respondent groups point to the necessity for a structured, competency-based training program that prioritizes the attainment of practical shipboard skills to achieve the required mission readiness, with recurring themes of simulation-based learning, extended training duration, and alignment with operational needs. COs recommended formal shipboard programs and qualification exams, while merchant marine officers emphasized BRM integration and continuous evaluations, aligning with instructors' calls for improved facilities and curriculum revisions. The exam's identification of weaknesses in navigation (e.g., anchoring procedures, set and current), COLREGS (e.g., sound signaling, restricted visibility actions), and engineering (e.g., lube oil contaminants, diesel injector pressure) provides evidence for an in depth 54-week program for non-maritime officers focused on navigation and marine engineering with its first half focused on theoretical subjects and the second half focused on practical skills. This program could elevate non-maritime officers to parity with maritime counterparts, addressing human error risks that cause 75% of maritime incidents (Sánchez-Beaskoetxea et al., 2021). These insights align with Tolentino's (2024) findings on the need to revise PCG Special Operations Forces training to meet operational demands, reinforcing that a tailored curriculum for non-maritime officers must align with the Coast Guard Fleet's mission requirements to ensure maritime safety, security, and environmental protection.

Conclusion

This study uncovers significant gaps in the Junior Shipboard Operational Level Course (JSOLC) of non-maritime officers, specifically in navigation, COLREGS, and marine engineering, as a result of educational mismatches that impede mission readiness for the Coast Guard Fleet. Theoretically, it elaborates competency-based training models (Tripathi & Agrawal, 2014) by transposing education-job mismatch models (Di Paolo & Mañé, 2016) to the maritime-coast guard context, emphasizing how non-maritime backgrounds (such as Nursing and Criminology) present steeper learning curves for non-maritime officers when it comes to shipboard watchstanding responsibilities. The integration of stakeholder feedbacks—Commanding Officers, Merchant Marine Officers, JSOLC Instructors, and examination outcomes—indicates that even though PCG administrative skills are robust, technical shortcomings threaten operational effectiveness, consistent with research that education misalignment decreases performance (Kim & Choi, 2018; Tan & Wang, 2021; Yussoff & Sulaiman, 2025). This adds to maritime education scholarship by highlighting the necessity for context-specific training to compensate for non-traditional maritime career skill gaps.

In practice, the findings of this study inform PCG training policy and curriculum development, recommending a systematic competency-based program to improve shipboard officer skill readiness. The suggested extended Non-Maritime Officers Course, focusing on navigation, engineering, and integration, covers areas of identified deficiencies in shiphandling, COLREGS, and technical skills and aligns with STCW requirements and PCG's mission for maritime safety, security, and environmental stewardship (Tolentino, 2024). By lengthening training time and adding simulator-based practical assessments, the PCG can reduce the risks of human error, responsible for 75% of maritime accidents (Sánchez-Beaskoetxea et al., 2021), and bring non-maritime officers to the same level as maritime-trained counterparts, towards sustaining the Coast Guard Fleet's operational objectives under Republic Act No. 9993.

Further studies should investigate longitudinal evaluations of the hypothesized training program's effects on mission results and non-maritime officer performance, assessing if extended practical training closes competency deficits in the long term. Further research can also examine the effectiveness of simulator training in improving navigation and engineering competency, leveraging new technologies (Mallam et al., 2019). This would further hone PCG training policies to provide sound preparation for junior billet officers in an ever-evolving maritime landscape.

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