Assessing the Philippine Coast Guard (PCG) Navigational Telex (NAVTEX) Operators' Competency Towards a Proposed Training Course

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Abstract

Aim: This study assessed the competency of Philippine Coast Guard (PCG) personnel assigned to NAVTEX operations to identify performance gaps and propose a structured training course aligned with international standards.

Methodology: Using a quantitative approach, 27 PCG NAVTEX operators were evaluated through scenario-based multiple-choice examinations that measured their knowledge and skills across five key areas: legal requirements, installation, operation, maintenance, and troubleshooting and repair.

Results: The survey results showed that participants demonstrated good comprehension of legal requirements yet their technical skills were weak especially in system operation and maintenance and troubleshooting areas.

Conclusion: The research findings led to the creation of a revised competency-based training program which combines simulation exercises with role-playing activities and diagnostic drills to enhance both theoretical knowledge and practical abilities. The proposed five-day training program consists of 40 hours that focuses on practical exercises and scenario-based learning to achieve operational readiness and regulatory compliance. The course implementation targets NAVTEX operation efficiency and safety improvement in the Philippines while supporting PCG modernization under the Global Maritime Distress and Safety System (GMDSS) framework.

Keywords: *Philippine Coast Guard, Navigational Telex (NAVTEX) Operators' Competency, Proposed Training Course*

INTRODUCTION

The NAVTEX system is a critical component of the Global Maritime Distress and Safety System (GMDSS), tasked with delivering Maritime Safety Information (MSI) within 200–400 nautical miles to ensure safe navigation and effective emergency response. In the Philippines, NAVTEX operations are managed by the Philippine Coast Guard (PCG), which assumed responsibility from the Department of Transportation to improve system integration and maritime safety. However, technical and operational challenges, such as outdated equipment and untrained personnel, led to the suspension of NAVTEX services in December 2023. The system's rehabilitation, targeted for completion by 2025, underscores the urgent need for skilled operators and specialized training to meet international standards.

Research highlights that the competency of NAVTEX operators is essential to the system's effectiveness. Studies emphasize the importance of simulation-based and competency-focused training to enhance operator decision-making, communication, and technical accuracy. The Philippine Coast Guard's training institutions have been found lacking in capacity to provide role-specific NAVTEX education (Manglicmot, 2019). Thus, a dedicated training program is necessary to address these gaps and ensure reliable NAVTEX services. Moreover, the establishment of a world-class Coast Guard Academy and enhanced inter-agency collaboration with bodies like PAGASA, NTC, and NAMRIA are seen as critical steps toward sustainable maritime safety in the country (Abanilla, 2024).

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Despite ongoing modernization efforts, current NAVTEX operations in the Philippines face compliance issues with SOLAS and GMDSS standards due to limited coverage, outdated infrastructure, and lack of a national GMDSS plan. The PCG broadcasts NAVTEX messages through designated frequencies and coordinates with PAGASA to transmit navigational alerts (Ong, 2021). Once rehabilitation is completed, NAVTEX coverage is expected to reach 320 nautical miles, greatly enhancing maritime safety. Ensuring effective PCG training and communication strategies will be essential for restoring the system's full functionality and reinforcing the country's maritime safety framework.

This research investigates how the Philippine Coast Guard (PCG) can enhance operator competencies for NAVTEX operations by integrating competency-based education, maritime training insights, and performance assessments. The study is anchored in the requirements of the SOLAS Convention, which mandates reliable transmission of navigational warnings and meteorological updates for maritime safety. However, the Philippines faces significant hurdles such as outdated infrastructure, operator skill gaps, and an incomplete national GMDSS framework (Abanilla, 2024). Although existing research supports the effectiveness of simulation-based and competency-focused training (Chiong, 2023; Hwang et al., 2022; Filonenko et al., 2023), these primarily address seafarer training and overlook the specific demands of land-based NAVTEX operations. This study fills that gap by evaluating PCG operators' competencies and creating a targeted training plan.

The research is grounded in Cathy Moore's Action Mapping Model, a performance-based instructional design approach that links training to real-world tasks. It identifies performance deficits—such as errors in message formatting, delayed responses, and inadequate equipment operation—through scenario-based evaluations. Training modules are developed to address these gaps using simulator exercises, decision-making tasks, and practical assessments, with ongoing evaluation through pre- and post-training tests and real-time performance monitoring. The Input-Process-Output (IPO) model frames the study's conceptual approach, emphasizing evidence-based interventions, focused skill-building, and continuous learning. By targeting critical areas like legal compliance, equipment operation, and system maintenance, the training program aims to enhance NAVTEX operational efficiency and improve maritime safety communications in the Philippines.

Objectives

This study aims to evaluate the competency of the Philippine Coast Guard personnel in NAVTEX operations as basis for developing a training course. Specifically, this study aims to address the following problems:

1. What is the level of knowledge and understanding of the PCG Operators about NAVTEX in terms of its:
    a. Legal Requirements?
    b. Installation?
    c. Operation?
    d. Maintenance?
    e. Troubleshooting and Repair?
2. What is the level of skills of PCG Operators in using NAVTEX in terms of:
    a. Application of Legal Requirements?
    b. Installation?
    c. Operation?
    d. Maintenance?
    e. Troubleshooting and Repair?
3. Is there a significant relationship between the level of knowledge and understanding of PCG operators and their application of skills about NAVTEX?
4. Based on the findings, what training course for NAVTEX operators can be proposed?

Hypothesis

1. There is no significant relationship between the level of knowledge and understanding of Philippine Coast Guard (PCG) operators and their level of skill application in NAVTEX operations, specifically in the areas of legal requirements, installation, operation, maintenance, and troubleshooting and repair.

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METHODS

Research Design

The study adopted a quantitative research design in order to determine the NAVTEX competency of the Philippine Coast Guard (PCG) personnel. Two major assessment tools were employed in the research: multiple-choice exams and scenario-based tests. These tools vary in format and focus, with the multiple-choice exams testing knowledge and understanding of the subject matter and the scenario-based assessments testing the application of knowledge in real-life situations. The data obtained from these assessments were presented in descriptive statistics to determine the level of competency of the personnel. Statistical tests were conducted to identify the significant differences based on the variables such as experience, rank and prior training. These assessments are intended to give a clear picture of the level of proficiency of PCG personnel in key NAVTEX-related tasks such as installation, operation, maintenance, and troubleshooting.

Population and Sampling

This study used purposive sampling to select 27 active Philippine Coast Guard (PCG) personnel directly involved in NAVTEX operations, ensuring participants had relevant roles, experience, and training. Respondents were chosen based on professional qualifications, work experience, technical skills, rank, and willingness to participate, guaranteeing valid and focused data. A scenario-based multiple-choice test was administered to assess their knowledge and decision-making skills related to NAVTEX procedures. This approach ensured that only qualified personnel with operational exposure and familiarity with maritime communication protocols were included, enabling a reliable quantitative analysis of NAVTEX competency.

Instrument

The primary research tool used in this study was a scenario-based, multiple-choice pen-and-paper test designed to assess the NAVTEX operational competencies of Philippine Coast Guard (PCG) personnel. The test simulated realistic maritime communication scenarios, aligning with SOLAS Chapters IV and V, the NAVTEX Manual, and ITU regulations, to evaluate knowledge of standard procedures, decision-making skills, and message interpretation. An open-ended question at the end allowed participants to suggest improvements in NAVTEX training and operations. While the test focused solely on theoretical understanding without practical evaluations, its reliability was confirmed through expert validation, pilot testing, and a split-half reliability test (r = .741), ensuring the instrument's consistency and appropriateness for assessing operator competencies.

Data Gathering Procedures

The competency evaluation of PCG NAVTEX operators was conducted remotely using a paper-based multiple-choice test as the main data collection tool. Due to participants being stationed in various locations, the process involved coordination with PCG supervisors to identify qualified respondents, who then received formal invitations and consent forms via email or Viber. The test, along with instructions, was sent in digital PDF format, and participants were asked to complete it independently within 30 minutes, without using reference materials. Responses were submitted either as photos of answer sheets or through a Google Form, and the researcher manually verified all submissions for accuracy before transferring the data into a spreadsheet for statistical analysis.

Data Analysis

The researcher reviewed and organized all completed scenario-based paper tests, assigning scores based on the number of correct answers per participant. Data were categorized according to participants' ranks, years of experience, and training backgrounds. Basic statistical tools were used to calculate averages, frequencies, and percentages, facilitating the assessment of overall performance and comparison among different groups. Findings were presented using tables and graphs to illustrate NAVTEX competency levels, legal compliance, and message handling abilities, making it easier to identify specific training needs and areas for improvement.

Ethical Considerations

This study adhered to strict ethical standards to ensure participant safety, confidentiality, and rights. Respondents were provided with an Informed Consent Form outlining the study's purpose, procedures, potential risks

and benefits, voluntary participation, and their right to withdraw at any time. Only consenting participants were included, and their data were anonymized, securely stored, and accessible only to authorized individuals. No personal identifiers were collected to uphold data privacy standards. Academic sources were properly cited, and originality was verified through Turnitin, showing 16% similarity and 0% AI-generated content. These measures ensured the ethical integrity and credibility of the study's quantitative findings.

RESULTS and DISCUSSION

Profile of the Respondents

The demographic profile of the 27 Philippine Coast Guard NAVTEX operators who took part in the study reveals a predominantly male workforce (74%), with most personnel holding junior ranks, particularly ASN-SN1 (71%). The majority had served in the PCG for 1–5 years (52%), indicating a relatively young workforce in terms of service duration. While 48% of respondents had attended the Radio Operators' Maintenance Course, a notable 44% reported having no NAVTEX-related training, underscoring a significant training gap. These findings suggest that NAVTEX operations are largely managed by junior, less experienced personnel, many of whom lack formal specialized training.

Level of Knowledge and Understanding of the PCG Operators about NAVTEX

The study evaluated the level of knowledge and understanding of 27 Philippine Coast Guard (PCG) NAVTEX operators across five critical areas: legal requirements, installation, operation, maintenance, and troubleshooting. Using theoretical exams and categorized accuracy rates, the study revealed significant gaps in most domains. While operators performed moderately well in understanding legal requirements—achieving a "Satisfactory" overall rating— other areas such as installation, operation, maintenance, and troubleshooting were mostly rated "Fairly Satisfactory" or "Needs Improvement," highlighting substantial room for improvement in both theoretical and practical competencies.

In the area of legal requirements, 45% of respondents achieved a Satisfactory rating, while 22% were Very Satisfactory and 33% Fairly Satisfactory. Notably, none reached the Excellent level. The highest performance was observed in identifying the regulation governing the transmission of Maritime Safety Information (MSI) (Item 1, 81%, Excellent), indicating a strong foundational understanding. However, operators struggled with legal decision-making in more complex scenarios, such as addressing signal interference (Item 6, 26%) and failure to broadcast during emergencies (Item 8, 33%). These were both rated Fairly Satisfactory. The overall average accuracy was 53%, suggesting a need for scenario-based legal training.

Regarding installation, nearly half of the operators (48%) were rated Needs Improvement, with only 7% achieving Very Satisfactory and none achieving Excellent. The average accuracy rate was only 35%, categorized as Fairly Satisfactory. The lowest performance was in identifying installation standards ensuring compliance with the Global Maritime Distress and Safety System (GMDSS) (Item 3, 11%). Other items like antenna placement (Item 1, 41%) and signal error identification (Item 5, 52%) showed only surface-level understanding.

In terms of operation, results showed 41% of respondents rated Needs Improvement and 33% as Fairly Satisfactory. The overall accuracy rate was 36%. While respondents showed moderate awareness in dealing with failed broadcasts (Item 1, 41%) and frequency interference (Item 3, 48%), significant gaps were observed in verifying MSI accuracy before transmission (Item 4, 19%), posing risks to maritime safety.

For maintenance, more than half (52%) of the operators were rated Needs Improvement, and only one achieved a Very Satisfactory rating. The average accuracy was 36%, deemed Fairly Satisfactory (Table 10). Poor performance was evident in items related to transmitter output checks (Item 1, 11%) and software/firmware update frequencies (Item 5, 26%). Although some knowledge existed on routine environmental maintenance (Item 3, 52%),

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overall responses reflected a lack of structured maintenance routines. Ongoing technical refresher training significantly improves maintenance reliability in maritime systems.

Finally, the troubleshooting and repair domain revealed the weakest performance, with 52% of operators rated Needs Improvement and none rated Excellent. While detailed data for this section were not fully provided in the prompt, preliminary findings from Table 12 indicated consistently low scores in diagnosing signal distortions and post-repair failures. The findings reflect an overarching lack of in-depth technical troubleshooting capability among PCG operators, which could hinder timely restoration of NAVTEX systems during real-world failures.

In summary, while PCG NAVTEX operators demonstrate a reasonable understanding of legal foundations, their capabilities are significantly lacking in the technical aspects of installation, operation, maintenance, and repair. These findings suggest an urgent need for targeted training programs—especially practical, situational, and hands-on approaches—to ensure the effective performance of NAVTEX systems, which are vital to maritime safety and communication.

Level of Skills of the PCG Operators about NAVTEX

The assessment of 27 Philippine Coast Guard (PCG) NAVTEX operators' skills revealed varied competency levels across legal requirements, installation, operation, maintenance, and troubleshooting related to NAVTEX. Overall, the majority of operators demonstrated only Fairly Satisfactory to Needs Improvement levels in most areas, with no operators achieving an Excellent rating in any domain. This highlights significant gaps in essential knowledge and practical skills critical for maritime safety communication.

In terms of legal requirements, 44% of operators scored Fairly Satisfactory while 19% needed improvement, indicating a weak understanding of international maritime regulations. The average accuracy in applying legal standards was 40%, reflecting Fairly Satisfactory competency. Operators showed relative strength in understanding message formatting requirements under SOLAS Chapter V (67%), but displayed critical weaknesses in time-sensitive message dissemination, error correction, and managing overlapping transmissions—areas vital for compliance and safety. For instance, only 15% correctly identified the maximum allowed time for broadcasting Maritime Safety Information (MSI), underscoring serious risks in emergency communications.

Installation skills were notably poor, with over half of the operators rated Needs Improvement (52%) and only 4% rated Excellent. The average accuracy rate was 39%, Fairly Satisfactory. Operators struggled with key technical tasks like mitigating signal reflection, power supply verification, and impedance testing, which are fundamental to ensuring equipment reliability and preventing communication failures. Improper installation causes chronic equipment faults that jeopardize the Global Maritime Distress and Safety System (GMDSS).

Operational competency also revealed significant deficiencies. No operators achieved Excellent, and 44% were rated Fairly Satisfactory, with a 36% average accuracy rate. While prioritization of distress signals was a relative strength (63% Very Satisfactory), operators showed limited knowledge in routine procedures such as troubleshooting signal problems, training new personnel, and ensuring message clarity. Preventive operational tasks are often overlooked in training, resulting in inconsistent performance during non-emergency operations.

Maintenance skills followed a similar trend, with 33% rated Needs Improvement and none Excellent. The average accuracy rate stood at 40%. Most operators understood basic maintenance actions like temperature checks and corrosion prevention, but only 7% correctly answered questions about cleaning schedules to prevent signal interference. The lack of preventive maintenance understanding is a common cause of avoidable equipment failures in maritime environments.

Troubleshooting and repair were comparatively stronger, with a 43% average accuracy rate—the highest among all domains—and 11% rated Very Satisfactory. Operators performed well in basic fault identification, such as diagnosing transmitter power issues (63%), but struggled with more complex problems like inconsistent power

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output (15%) and message decoding errors (33%). Operators often lack skills in advanced diagnostics, which compromises the ability to resolve intermittent or complex faults affecting communication quality.

In summary, the overall skill levels of PCG NAVTEX operators reflect an urgent need for comprehensive, competency-based training. The dominance of Fairly Satisfactory and Needs Improvement ratings across all areas signals gaps in foundational knowledge, technical precision, and preventive practices. Targeted modules that reinforce legal compliance, enhance hands-on installation and maintenance skills, and build troubleshooting expertise—supported by scenario-based learning—are critical to improving system reliability and maritime safety.

Significant Relationship between the Level of Knowledge and Understanding of PCG Operators and Their Application of Skills about NAVTEX

Table 1. Correlation Analysis of Level of Knowledge and Understanding of PCG Operators and Their Application of Skills about NAVTEX

AREAS		
1. Legal Requirements:	Correlation Coefficient	.575**
	Sig. (2-tailed)	.002
	N	27
2. Installation:	Correlation Coefficient	.686***
	Sig. (2-tailed)	<.001
	N	27
3. Operation:	Correlation Coefficient	.069
	Sig. (2-tailed)	.732
	N	27
4. Maintenance:	Correlation Coefficient	.262
	Sig. (2-tailed)	.187
	N	27
5. Troubleshooting and Repair:	Correlation Coefficient	.160
	Sig. (2-tailed)	.425
	N	27

*Note: **. Correlation is significant at the 0.01 level (2-tailed).*

***. Correlation is significant at the 0.001 level (2-tailed).

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The correlation analysis between the level of knowledge and understanding of PCG NAVTEX operators and their practical application of skills revealed significant relationships in some areas but not in others. Notably, there was a moderately strong positive correlation in Legal Requirements (r = .575, p = .002) and an even stronger correlation in Installation (r = .686, p < .001), indicating that operators with better theoretical knowledge in these areas also demonstrated better practical skills. These findings suggest that knowledge about legal frameworks and installation procedures effectively translates into practical competence for these operators.

In contrast, other key areas such as Operation, Maintenance, and Troubleshooting and Repair showed weak and statistically insignificant correlations (ranging from .069 to .262, all p > .05). This indicates a disconnect between the operators' theoretical understanding and their practical skills in these technical aspects. The results highlight the need for targeted training programs to bridge the gap between theory and practice, especially in operational, maintenance, and repair tasks where knowledge does not strongly predict skill application. Such interventions could improve overall NAVTEX system effectiveness among PCG operators.

Proposed Training Course for PCG NAVTEX Operators

The proposed training course for PCG NAVTEX operators is designed to address skill deficiencies identified through research, aligning course content with key areas such as legal requirements, installation, operation, maintenance, and troubleshooting of NAVTEX systems. Its main objectives include equipping participants with knowledge of international maritime regulations, hands-on skills for installing and operating NAVTEX equipment, and abilities to maintain and repair the system effectively. The course targets PCG personnel involved in NAVTEX operations, including officers from communications and search-and-rescue units, ensuring that operators gain competency critical to maritime safety communication.

Structured into six comprehensive modules, the training combines theoretical lessons with practical exercises such as workshops, simulations, and case studies. Modules cover SOLAS and GMDSS regulations, installation procedures, operational management including emergency message handling, maintenance routines, and troubleshooting techniques. The learning approach emphasizes competency-based assessment through written exams, practical tests, and scenario drills to ensure that participants can apply their knowledge in real-world settings. The training spans five days and totals 40 hours, culminating in a certification awarded to those who meet the required 70% passing score.

Overall, the course aims to enhance the efficiency and reliability of NAVTEX operations within the Philippine Coast Guard by bridging gaps between theoretical knowledge and practical application. By adhering to international standards set by the IMO, STCW, and SOLAS, this training ensures that operators are well-prepared to manage maritime safety communications effectively, contributing to safer navigation and improved maritime safety across Philippine waters.

Conclusion

The study reveals that while PCG NAVTEX operators possess satisfactory basic knowledge of legal frameworks, significant gaps exist in their understanding and application of key competencies, particularly in emergency broadcast handling, equipment installation, operation, maintenance, and troubleshooting. The strong correlation between installation knowledge and skills contrasts with weak links in operational, maintenance, and troubleshooting domains, highlighting a critical gap between theoretical understanding and practical ability. This disconnect threatens maritime safety by increasing the risk of non-compliant broadcasts, system inefficiencies, and communication failures. Thus, a comprehensive, competency-based training course aligned with international standards is essential to enhance operator proficiency and ensure reliable NAVTEX system performance.

Recommendations

It is strongly recommended that the Philippine Coast Guard adopt and implement the proposed NAVTEX training course, which directly addresses identified knowledge and skill deficiencies through modules emphasizing hands-on exercises, simulations, and compliance with IMO and GMDSS regulations. Beyond training, initiatives should be developed to modernize NAVTEX equipment, improve ergonomic station designs, and strengthen technical

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support systems to further enhance operational efficiency. Commanders must ensure that only personnel who complete the training and demonstrate competency are designated as NAVTEX operators to maintain high operational standards. Additionally, future research should investigate the long-term effectiveness of the training program, assess the impact of technological advancements, and benchmark PCG competencies against international maritime agencies to continuously improve NAVTEX operations.

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