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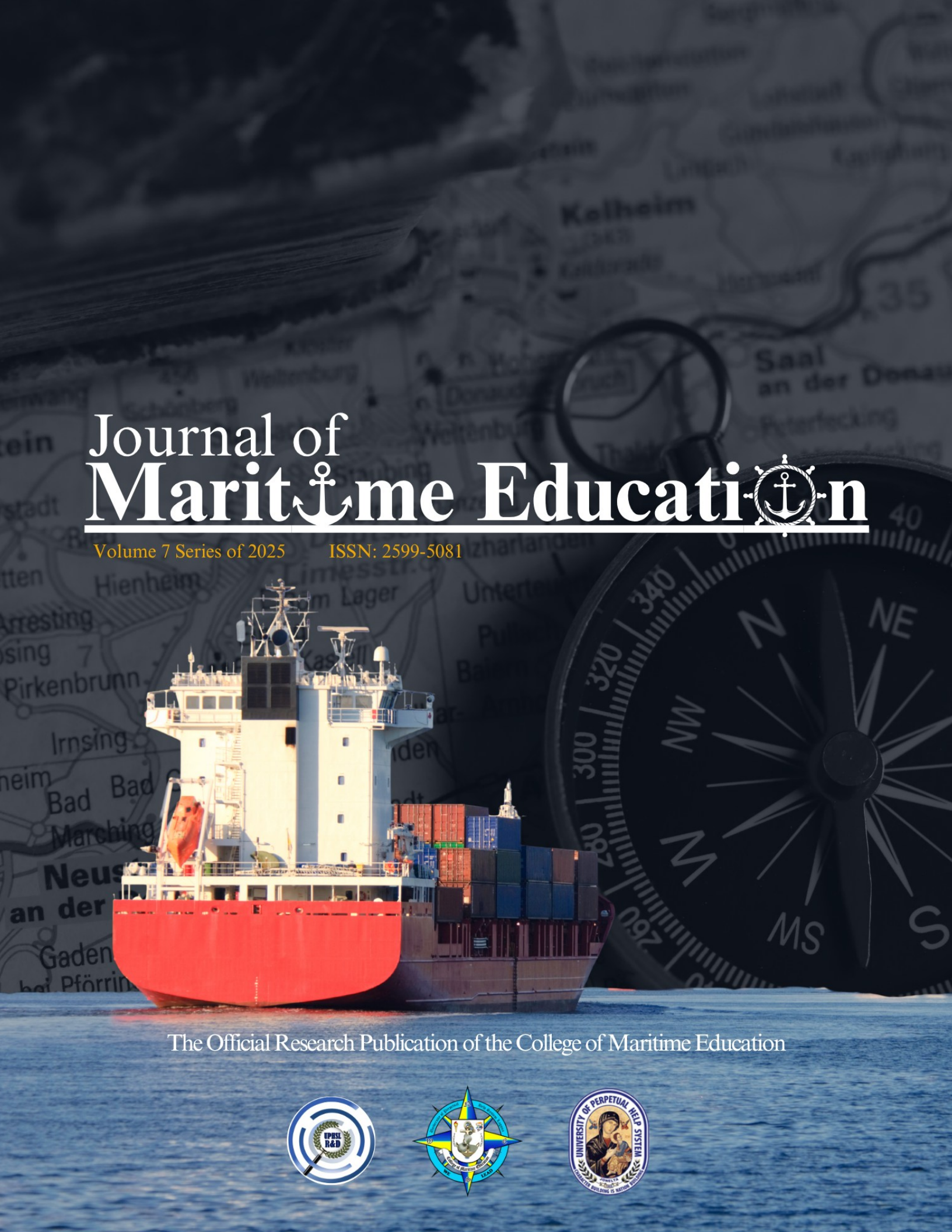

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The Journal of Maritime Education

The Official Journal of the College of Maritime Education

The Journal of Maritime Education is a collection of faculty and student research works in 2025. The research papers highlight the practical training programs, hands-on competence, and safety preparedness of maritime students, while exploring the specific challenges and personal growth they experience during shipboard and simulator-based learning. As a whole, the research articles provide evidence-based insights on various issues concerning the maritime education of UPHSL involving its instructional force and learners

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Editor's note

The 2025 issue of **The College of Maritime Education** encompasses five multi-disciplinary research papers which unfold the students' concerns on digital competence, mental health, hybrid learning environments, and career motivations. This further opens the discussion on how maritime students delve and adapt in the changing landscape as society poses unprecedented challenges and opportunities in the post-pandemic era. Moreover, the five featured research articles contribute to the university's scholarly works in the pursuit of high-impact, relevant, and critically acclaimed studies.

Here is a revised version of the transcript, completely tailored to match your five new research titles while keeping that professional, editorial tone:

The journey of maritime education begins with real-world exposure and how students perceive their initial training at sea. The study entitled **"Perception of Vessel-Based Training Program and Challenges Encountered Among Maritime Students of UPHSL - Jonelta"** explores how students navigate structural and operational onboard learning, mapping out the specific friction points they encounter during real-world training. Alongside these onboard perceptions, foundational technical skills remain essential for maritime success. The research **"Knowledge, Skills, and Competence in Lathe Machine Operation of Selected Marine Engineering Students of University of Perpetual Help System Laguna"** evaluates the core mechanical proficiencies of the respondents, demonstrating how targeted practical instruction builds critical engine room engineering capabilities.

Safety, resilience, and crisis management also serve as vital areas of ongoing inquiry within current maritime education. The investigation **"Impact of Safety Training, Risk Awareness, and Emergency Preparedness on Crisis Response Skills of Maritime Students"** establishes how rigorous preemptive safety education directly shapes split-second crisis decision-making, emphasizing that a strong safety culture significantly boosts immediate response skills. Following this focus on safety and crisis readiness, the ultimate test of adaptation occurs during the students' initial transition to the sea. The study **"Challenges Encountered and Personal Growth During Shipboard Familiarization of Selected Maritime Students of the University of Perpetual Help System Laguna"** tracks the transformative nature of these experiences, revealing that despite the intense initial hurdles faced during shipboard orientation, the process fundamentally drives personal growth, adaptive maturity, and professional resilience in the future seafaring crew. Finally, complementing this focus on applied skill-building and sea readiness, the research **"Bridge Simulator Training, Learning Efficiency, and Practical Competence of Maritime Students with Completed Classroom Instruction"** highlights the crucial transition from theory to practice, proving that advanced simulator-based learning drastically optimizes training efficiency and solidifies operational competence once textbook learning is done.

We express our sincere appreciation to the esteemed contributors whose research endeavors and profound insights have enriched the pages of this publication. As we navigate the dynamic and ever-evolving terrain of education and beyond, we cordially invite our readers to engage with the insightful research and innovative perspectives encapsulated within these pages. This edition stands as a testament to the collective commitment to excellence that defines our scholarly community.

Zachary C. Lacuesta
Editor-in-Chief

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PERCEPTION OF VESSEL - BASED TRAINING PROGRAM AND CHALLENGES ENCOUNTERED AMONG MARITIME STUDENTS OF UPHSL - JONELTA

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Abstract

This study examined the perception of vessel-based training programs and the challenges encountered by maritime students of UPHSL–Jonelta. A descriptive-correlational research design was employed, involving 69 respondents composed primarily of BS Marine Transportation (82.6%) and 3rd-year students (66.7%). Data were gathered through a researcher-made questionnaire that underwent validity evaluation and reliability testing, yielding excellent internal consistency for both perception (α = .908) and challenges (α = .968). Findings revealed that respondents hold a very positive perception of vessel-based training, as reflected by the overall weighted mean of 3.58, interpreted as "Strongly Agree." They strongly affirmed that vessel-based training effectively develops safe navigational skills, professional competence, hands-on application, and career motivation. Among the indicators, developing safe navigational skills ranked highest (Mean = 3.64), while enhancing knowledge of international maritime law received the lowest mean (3.51), though still rated positively. Despite favorable perceptions, students reported challenges in translating theoretical knowledge into real ship operations, adjusting to onboard tasks, and coping with physical and operational constraints. Statistical analyses revealed no significant difference in respondents' perceptions or challenges when grouped according to degree program or year level, with all p-values exceeding 0.05. Likewise, Pearson's correlation ($r = .100$, $p = .413$) indicated no significant relationship between perception of training and challenges encountered. The study concludes that vessel-based training is generally effective and positively regarded across student groups, while challenges experienced are similar regardless of academic profile. Enhancing instructional alignment between classroom learning and real-world vessel operations is recommended to further strengthen maritime training outcomes.

Keywords: Descriptive-Correlational Research, Maritime Education, Operational Challenges, Student Perception, and Vessel-Based Training

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Introduction

Vessel-based training offers significant learning opportunities; it also presents various challenges that can impact students' learning experiences. Factors such as limited onboard facilities, Supervision and mentorship, Physical and mental challenges and operational constraints may affect the effectiveness of training. Understanding students' perceptions of these training programs, along with the difficulties they encounter, is crucial in assessing the overall impact of vessel-based training on maritime education.

According to (International Journal of English Literature and Social Sciences, 2023) the Philippines is a major provider of seafarers, with the majority of Filipino sailors serving on merchant ships all around the world. To stay competitive in the global market, most shipping companies recruit maritime students through a variety of processes and provide them with the necessary knowledge, expertise, and skills. The experience of maritime cadets/cadettes in the workplace aids them in realizing and grasping the employment needs onboard merchant vessels. This quantitative research study assessed the onboard experiences of PMMA cadets in order to improve the academy's shipboard training program and policy. A researcher-made survey questionnaire via Google form was used to gather data from the 162 First Class cadets/cadettes who were graduating midshipmen of SY 2020-2021. The study found out that the cadet-trainees were exposed to technical tasks during their shipboard training. In terms of challenges onboard, they never at all experienced sexual and verbal harassment and abuse. Accordingly, they have very low experience related to civic disengagement. Inculcating high tolerance in shipboard training related to work stress and condition is one of the strengths of the PMMA Shipboard Training Program and the assignment and availability of training officers on board was noted as one of its weaknesses.

According to Tvedt et al. (2018), in the maritime industry, it is of vital importance that personnel onboard ships are familiarized with the ship's layout, along with safety equipment and processes for safeguarding of the individual seafarer and the ship's crew. In fact, international maritime regulations require that all personnel employed or engaged on a seagoing ship receive proper familiarization training. However, several studies have identified lack of familiarization as a contributing factor to maritime incidents. Therefore, this study aims to explore the perceptions of maritime students at UPHSL - JONELTA regarding vessel-based training programs and the challenges they face during their training. The findings of this research will provide insights into the effectiveness of these programs and help identify areas for improvement to enhance the learning experience of future maritime professionals.
In order to prepare new sailors for the difficulties of the shipping business, maritime education is essential. Vessel-based training programs, which give students practical experience in shipboard operations, are one of the most important aspects of maritime education. By bridging the gap between theoretical understanding and real-world application, these programs hope to improve students' abilities and flexibility in the maritime industry.

Methods

This study used a descriptive-correlational quantitative research method, as it aims to describe the maritime students' perceptions of vessel-based training programs and the challenges they encounter. According to Francisco (2020), a correlational study is used to identify relationships between two or more variables. In this study, the independent variable was the perception of vessel-based training program while the dependent variable was the challenges encountered of the students of maritime transportation of UPHSL-JONELTA. Through this research design, this quantitative study emphasised objective measurements and the statistical or numerical analysis of data collected through questionnaires and surveys.

The study aimed at determining the perception of vessel-based training program and challenges encountered by the maritime students. The total population of 2nd year and 3rd year is 345 clustered into two (2) degree programs, BS Marine Transportation, and BS Marine Engineering. To compute for the sample size, the researchers opted to used 20% of the total population. Out of 345, the target respondents were 69.
.

The researchers used a researcher-made questionnaire for the purpose of collecting the needed primary data. The instrument was divided into two (2) parts. Part I dealt with the respondent's perception on vessel - based training program. Part II covered the challenges encountered of the selected maritime student. Since the questionnaire was non-standardised, it was subjected to the face and content validity and Cronbach's alpha reliability test. It was presented to a panel of experts in Maritime education, research, and statistics for feedback and suggestions.

Results of pilot testing showed that the indicators for Perception of Vessel-Based Training (.908), Challenges Encountered in Vessel-Based Training (.968) all demonstrated excellent internal consistency, indicating that the measurement tools used in the study were reliable and produced consistent responses across the surveyed participants. This suggests that the constructs were measured with sufficient accuracy to support the validity of the study's findings.

Frequency and percentage distribution were used to describe the profile of the respondents in terms of degree program and year level. Weighted mean was used to describe the respondents' a) perception and b) challenges encountered in vessel-based training. Mann-Whitney u test was used to determine the difference in the respondents' a) perception and b) challenges encountered in vessel-based training when grouped according to their degree program and year level. Pearson's r moment correlation coefficient was used to determine the relationship between the respondents' perception and challenges encountered in vessel-based training.

Results and Discussion

1. Profile of the Respondents

Table 1
Profile of the Respondents

Profile Variables	Frequency	Percentage
Degree Program		
BS Marine Transportation	57	82.6
BS Marine Engineering	12	17.4
Year Level		
2nd Year	23	33.3
3rd Year	46	66.7
N=69		

Table 1 presents the profile of the 69 maritime student respondents according to degree program and year level. Most participants are enrolled in BS Marine Transportation (57 students or 82.6%), while only 12 students (17.4%) belong to BS Marine Engineering, showing that the sample is largely composed of deck cadets. In terms of year level, 23 respondents (33.3%) are second-year students, whereas 46 respondents (66.7%) are third-year students. Research in maritime education often highlights that BSMT students make up the largest portion of cadets undergoing shipboard training, as they follow a competency-based curriculum requiring extensive onboard experience. According to the International Maritime Organization (IMO, 2021), maritime colleges frequently deploy more deck cadets than engine cadets due to program enrollment trends and training berth availability.

2. Respondents' Perception of Vessel-Based Training

Table 2
Respondents' Perception of Vessel-Based Training

Indicators	Weighted Mean	Verbal Interpretation	Rank
1. Vessel-based training program develops the skills of students for a professional setting.	3.59	Very Positive	4.5
2. Vessel-based training program greatly enhances career motivation.	3.59	Very Positive	4.5
3. Vessel-based training program provides hands-on instruction.	3.61	Very Positive	3
4. Vessel-based training program explores methods to improve knowledge.	3.58	Very Positive	6.5
5. Students acknowledge how their learned skills might be applied in the real world.	3.54	Very Positive	9
6. Vessel-based training program develops safe navigational skills, emphasizing the value of skilled navigators.	3.64	Very Positive	1
7. Vessel-based training program improves knowledge of international maritime law.	3.51	Very Positive	10
8. Vessel-based training program helps future seafarers gain the skills and knowledge necessary to navigate the complexities of the modern maritime world.	3.57	Very Positive	8
9. Vessel-based training program provides outstanding instruction that helps students become competent professionals.	3.58	Very Positive	6.5
10. Vessel-based training develops competent professionals.	3.62	Very Positive	2
Overall Weighted Mean	3.58	Very Positive	

Table 2 presents the respondents' perception of the Vessel-Based Training Program among maritime students of UPHSL–Jonelta. Overall, the program received a weighted mean of 3.58, interpreted as Strongly Agree, indicating a highly positive perception of its effectiveness in preparing students for professional maritime practice. Among the indicators, the highest-rated item is "Vessel-based training program develops safe navigational skills, emphasizing the value of skilled navigators" (WM = 3.64, Rank 1). This suggests that students perceive navigational skill development as the most evident and impactful outcome of the training. This is followed by "Vessel-based training develops competent professionals" (WM = 3.62, Rank 2), highlighting the program's strong contribution to student competency and professional readiness. Hands-on instruction (WM = 3.61, Rank 3) also ranked highly, showing that students greatly value experiential learning opportunities offered on board. Items related to skill development, career motivation, and instructional quality (WM = 3.58–3.59, Ranks 4.5 to 6.5) also received strong agreement, reflecting the program's consistent effectiveness across multiple learning dimensions. The lowest-rated indicator, though still interpreted as Strongly Agree, is improvement of knowledge in international maritime law (WM = 3.51, Rank 10). This suggests that while the program remains effective, students perceive comparatively fewer learning gains in this specific area, possibly indicating a need for strengthened curricular emphasis.

To sum up, an average weighted mean of 3.58 showed that the respondents have a very positive perception of vessel-based training indicated that it develops their navigational skills, competencies, and provide hands-on instruction Several studies in Maritime Education and Training confirm that hands-on experience at sea helps improve students' navigational skills, safety awareness, confidence, and readiness for real-world responsibilities (Kim et al., 2021; Bačnar, 2025). Research also highlights that vessel-based training increases students' motivation to pursue maritime careers because it exposes them to the real environment where they will eventually work.

3. Respondents' Challenges Encountered in Vessel-Based Training

Table 3
Respondents' Challenges Encountered in Vessel-Based Training

Indicators	Weighted Mean	Verbal Interpretation	Rank
1. I have difficulty applying classroom knowledge in real ship operations.	3.17	Agree	1
2. The onboard tasks are not aligned with my academic training.	3.09	Agree	2
3. There is limited opportunity to learn and practice technical skills.	3.04	Agree	5.5
4. I do not receive proper guidance from my onboard training instructor.	3.03	Agree	7.5
5. There is no clear training plan or program provided to me.	3.06	Agree	3.5
6. I often have to learn tasks by myself without supervision.	3.00	Agree	10
7. There is no strong connection between classroom theories and actual onboard operations.	3.03	Agree	7.5
8. The training plan is not followed and explained to me clearly.	3.06	Agree	3.5
9. I have no access to reference materials (manuals, charts, etc.) relevant to my academic subjects.	3.01	Agree	9
10. I am not oriented on how to properly handle tools and equipment.	3.04	Agree	5.5
Overall Weighted Mean	3.06	Agree	

Table 3 presents the challenges encountered by maritime students during vessel-based training. The overall weighted mean of 3.06, interpreted as Agree, indicates that students commonly experience several difficulties while undergoing practical shipboard training. The highest-rated challenge is "difficulty applying classroom knowledge in real ship operations" (WM = 3.17, Rank 1), suggesting that students find it challenging to translate theoretical learning into actual maritime tasks. This highlights a persistent gap between academic preparation and real-world application. Closely following is the concern that "onboard tasks are not aligned with academic training" (WM = 3.09, Rank 2), indicating perceived inconsistencies between what students are taught and what they are required to perform onboard. Issues related to unclear or insufficient training guidance also emerged as notable concerns. Students reported the absence of a clear training plan (WM = 3.06, Rank 3.5) and the lack of explanation or proper follow-through of such plans (WM = 3.06, Rank 3.5). This suggests that structured supervision and well-defined learning pathways may not always be implemented consistently during training. Other challenges include limited opportunities for technical skill development (WM = 3.04, Rank 5.5) and inadequate orientation on handling tools and equipment (WM = 3.04, Rank 5.5), which may hinder students' confidence and competence in operational tasks. Students also pointed out difficulties such as insufficient supervision when learning tasks (WM = 3.00, Rank 10) and limited access to reference materials relevant to their academic subjects (WM = 3.01, Rank 9). These concerns reflect gaps in instructional support and resource availability onboard.

To sum up, an average weighted mean of 3.06 showed that the respondents agreed to experience challenges in vessel-based training primarily on applying classroom knowledge, misalignment with academic training, and no clear training plan provided. According to Mori (2024), the transition from academic learning to onboard practice can be difficult because ship operations are fast-paced, unpredictable, and require immediate application of knowledge, which may overwhelm trainees.

4. Difference in the Respondents' Perception of Vessel-Based Training When Grouped According to their Profile Variables

Table 4

Difference in the Respondents' Perception of Vessel-Based Training When Grouped According to their Profile Variables

Variables		Mean Rank	Inferential Statistics	p-value	Decision	Interpretation
Degree Program	BSMT	33.44	U=253.000 Z=-1.435	.151	H_0 not rejected	Not Significant
	BSME	42.42				
Year Level	2nd Year	39.52	U=425.000 Z=-1.349	.177	H_0 not rejected	Not Significant
	3rd Year	32.74				

*Significant @ .05

Table 4 presents the differences in respondents' perception of vessel-based training when grouped according to their profile variables. The results show that no significant differences were found based on either degree program or year level, as all p-values (.151 for degree program and .177 for year level) were higher than the 0.05 level of significance. Therefore, the null hypothesis was not rejected. For the degree program, both BSMT (Mean Rank = 33.44) and BSME (Mean Rank = 42.42) students demonstrated statistically similar perceptions of the vessel-based training program. This indicates that regardless of specialization, students share common views regarding the effectiveness and quality of their onboard training experiences. Similarly, for year level, both 2nd year (Mean Rank = 39.52) and 3rd year students (Mean Rank = 32.74) showed no significant difference in their perceptions. This suggests that the perceived benefits and experiences in vessel-based training remain consistent across different stages of students' academic progression. Overall, the findings imply that the vessel-based training program at UPHSL–Jonelta provides a relatively uniform experience for students regardless of degree program or year level. This consistency indicates that the program is implemented in a way that delivers similar training quality and learning opportunities to all maritime students.

5. Difference in the Respondents' Challenges Encountered in Vessel-Based Training When Grouped According to their Profile Variables

Table 5

Difference in the Respondents' Challenges Encountered Vessel-Based Training When Grouped According to their Profile Variables

Variables		Mean Rank	Inferential Statistics	p-value	Decision	Interpretation
Degree Program	BSMT	34.76	U=328.500 Z=-.214	.830	H_0 not rejected	Not Significant
	BSME	36.13				
Year Level	2nd Year	33.20	U=487.500 Z=-.530	.596	H_0 not rejected	Not Significant
	3rd Year	35.90				

*Significant @ .05

Table 5 presents the results of a comparative analysis examining whether the challenges experienced by maritime students during vessel-based training differ significantly when grouped according to two profile variables: degree program (BSMT vs. BSME) and year level (2nd year vs. 3rd year). The Mann-Whitney U test was employed to assess differences in mean ranks between groups, given the non-parametric nature of the data. For the degree program, students enrolled in Bachelor of Science in Marine Transportation (BSMT) had a mean rank of 34.76, while those in Bachelor of Science in Marine Engineering (BSME) had a slightly higher mean rank of 36.13. The computed U-value was 328.500 with a p-value of .830, which is well above the significance threshold of .05. Similarly, the Z-score of -0.214 further supports the absence of a statistically significant difference. Thus, the null hypothesis (H_0) was not rejected, indicating that students from both programs encountered comparable levels of challenge during vessel-based training. In terms of year level, 2nd-year students had a mean rank of 33.20, while 3rd-year students had a mean rank of 35.90. The U-value of 487.500 and p-value of .596, along with a Z-score of -0.530, also suggest no significant difference in the challenges faced between these two cohorts. Again, the null hypothesis was not rejected. These findings imply a uniformity in the perception of challenges across both academic programs and year levels. Regardless of whether students are pursuing marine transportation or marine engineering, or whether they are in their second or third year of study, their experiences with vessel-based training appear to be similarly demanding. This consistency may point to shared structural or systemic issues within the training program itself—such as limited access to onboard resources, insufficient mentorship, or logistical constraints—that affect all students equally. The lack of significant variation also suggests that interventions aimed at improving vessel-based training should be holistic and inclusive, rather than tailored to specific subgroups. Program administrators and maritime educators may consider implementing standardized support mechanisms, such as enhanced pre-departure orientations, onboard training modules, or feedback systems that address common pain points experienced by students across the board.

In summary, the data in Table 5 reinforces the notion that the challenges encountered in vessel-based training are not isolated to particular academic tracks or year levels, but are instead reflective of broader conditions within the maritime training environment. This insight is crucial for shaping responsive and equitable improvements to the training program, ensuring that all students—regardless of background—are adequately supported in their professional development.

6. Relationship Between the Respondents' Perception and Challenges Encountered in Vessel-Based Training

Table 6
Relationship Between the Respondents' Perception and Challenges Encountered in Vessel-Based Training

Variables	Statistical Treatment (Pearson's)	p-value	Decision	Interpretation
Perception and challenges in vessel-based training	r=.100 (negligible correlation)	.413	H_0 not rejected	Not Significant
*Significant @.05				

Table 6 presents the statistical relationship between maritime students' perception of the vessel-based training program and the challenges they encountered during its implementation. Using Pearson's correlation coefficient, the analysis yielded an r-value of .100, which indicates a negligible correlation between the two variables. The corresponding p-value of .413 exceeds the standard significance threshold of .05, leading to the decision to not reject the null hypothesis (H_0). This result confirms that the relationship between students' perception and the challenges they faced is not statistically significant. This finding suggests that students' views of the vessel-based training program—whether positive or negative—do not meaningfully influence or reflect the extent of challenges they encounter. In other words, a student may perceive the training as beneficial or well-structured, yet still face considerable difficulties, or conversely, may perceive the program as lacking but experience fewer challenges. This disconnect implies that perception and actual experience of challenges operate independently within the context of vessel-based training. Several factors may contribute to this negligible correlation. Perception is often shaped by broader influences such as institutional reputation, peer narratives, or expectations set during academic preparation. Challenges, on the other hand, are typically grounded in practical realities—such as onboard conditions, access to mentorship, safety protocols, and logistical support. The lack of a strong relationship between these two dimensions highlights the complexity of maritime training, where subjective evaluation does not necessarily align with objective experience. This means that the respondents' perception of vessel-based training is not associated with the challenges they encountered in it. Santos and Villanueva (2022) found that training challenges often arise from system-level factors—such as instructor availability, vessel schedules, and the structure of the training program—rather than from students' academic background. This explains why BSMT and BSME respondents experience challenges of similar nature and intensity.

Conclusions

Based on the results of the study, the following conclusions were drawn: The respondent group is predominantly composed of third-year students enrolled in the BS Marine Transportation program. The respondents have a highly favorable perception of the vessel-based training program. The respondents generally agree that they encounter several challenges in vessel-based training, Primarily on applying classroom knowledge, misalignment with academic training, and lack of clear training plan. Students across programs and year levels have similar perceptions of vessel-based training. Students across programs and year levels experience similar challenges in vessel-based training. The respondents' perceptions of vessel-based training are not associated with the challenges they experience.

Future Direction

Based on the results of the study, the following recommendations were offered: These recommendations are intended for maritime institutions, shipping companies, training supervisors, and curriculum developers involved in managing and improving the vessel-based training program of UPHSL–JONELTA. To improve the alignment between academic preparation and actual shipboard training by strengthening the training program, addressing student challenges, and ensuring clearer and more structured training plans. By enhancing school–industry coordination, integrating more practical simulations and hands-on activities in the curriculum, and establishing a standardized monitoring and feedback system for all cadets during deployment. These improvements should be implemented before the next batch of UPHSL–JONELTA students undergo vessel-based training, with continuous evaluation throughout each training cycle.

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KNOWLEDGE, SKILLS, AND COMPETENCE IN LATHE MACHINE OPERATION OF SELECTED MARINE ENGINEERING STUDENTS OF UNIVERSITY OF PERPETUAL HELP SYSTEM LAGUNA

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Abstract

The maritime industry plays a crucial role in global trade and transportation, requiring skilled professionals to operate and maintain various types of machinery. Among these, lathe machines were integral to the maritime industry, particularly in shipboard workshops, where they are employed for tasks such as manufacturing, cutting, shaping, and verifying various ship components. Using a descriptive-correlation research design, data was gathered from 41 respondents through a validated and reliable survey questionnaire. Findings revealed that the respondents demonstrated very high levels of knowledge, skills, and competence in lathe machine operation. Statistical analysis showed a significant relationship between knowledge and skills, as well as between skills and competence, indicating that increased knowledge enhances skills, and advanced skills strongly contribute to competence. However, no significant relationship was found between knowledge and competence alone, emphasizing the importance of hands-on practice in developing operational proficiency. The study concludes that practical experience remains essential in strengthening machine competence and recommends continuous training, updated instructional approaches, and enhanced machine shop facilities to further support skill development.

Keywords: Knowledge assessment, Lathe machine operation, Maritime industry, Marine engineering, Skill development

Introduction

The maritime industry plays a crucial role in global trade and transportation, Among these, lathe machines were integral to the maritime industry, particularly in shipboard workshops, where they are employed for tasks such as manufacturing, cutting, shaping, and verifying various ship components. Their versatility allows for operations like machining, surface finishing, thread creation, and gear fabrication, making them indispensable for maintaining and repairing ship parts (Anish, 2021). Proficiency in lathe machine operations was essential for marine engineering students, as it directly impacted their ability to perform critical tasks in marine and industrial settings.

A comprehensive understanding of lathe operations enabled students to manufacture and repair components vital to marine machinery. The study by Maritime Academy of Asia and the Pacific (2020) analyzed various machining operations to determine which was most and least utilized on ships. This analysis provided valuable insights into areas where training should be concentrated to enhance machining skills among marine engineering students. By focusing on the most frequently used operations, training programs can ensure that students develop the competencies necessary for effective lathe machine operation. Additionally, a report from the International Journal of Engineering Education (2020) emphasized that incorporating hands-on lathe training into vocational curricula leads to better job preparedness and increased competency in precision machining tasks.

A study by Pommarang and Kenaphoom (2024) emphasized that Work-Based Education (WBE) effectively combines academic learning with practical experience. This integration equips students with industry-specific skills, thereby improving their employability. The study suggested that aligning educational goals with labor market demands, through methods like competency- based education and project-based learning, enhances workforce readiness. Additionally, Pince Maduabuchukwu (2024) identified a lack of practical exposure as a significant barrier to effective skill acquisition in lathe operations. The findings suggested that integrating practical projects with theoretical learning enhances students' proficiency and readiness for the workforce.

In addition, according to Russ Willcut (2020), the shift from manual lathes to automated systems has revolutionized manufacturing and machining processes. It involved the operation, maintenance, and repair of complex machinery used in maritime vessels. In this field, marine engineering require a strong foundation in technical skills and practical knowledge on both manual and automated systems. Which is critical for fabricating and repairing ship components. Russ Willcut also stated that for marine students, understanding this transition is crucial because the maritime industry relies heavily on precision machining for the fabrication, repair, and maintenance of ship components. It highlighted the importance of adaptability and continuous learning in the maritime industry.

However, a study by Caiga (2022) found that there was a concern regarding the ratio of machines to students and the quality of equipment, which could impact skill acquisition in lathe operations. Additionally, the marine engineering curriculum in the Philippines (n.d) emphasized practical training in machine shop operations. The curriculum was designed to prepare students for shipboard operations, focusing on the maintenance and repair of ship machinery installations. This included practical seamanship subjects and extensive hands in training in machine shop operations, which were essential for developing competencies in lathe machine operations.

Despite the importance of lathe machine operation in marine engineering, there was limited research assessing the knowledge, skill, competencies of students. A study conducted by Rosello H. Roble (2019) in the Davao Region, Philippines, provides relevant insights. This research assessed the effect of industry exposure on various machine shop skills, including lathe operations. Findings revealed that prior to industry exposure, students exhibited low proficiency in lathe operations, primarily due to outdated or malfunctioning equipment and insufficient faculty training. Post-exposure, there was a notable improvement, with students achieving moderate proficiency, underscoring the significance of practical industry experience in skill development.

Thus, this study was conducted. This aimed to evaluate the level of knowledge, skills, and competencies of marine engineering students in lathe machine operation of University of Perpetual Help System Laguna. It sought to address the theoretical knowledge, practical skills, and the overall competencies of marine engineering students to lathe machine operation.

Methods

The researchers employed a descriptive correlation method in gathering the data since this method was suitable to determine the level of knowledge, skills, and competence in lathe machine operation. This type of research endeavored to describe systematically, factually, accurately and objectively a situation, problem or phenomenon (McCombes, 2023). Through this research design, quantitative study emphasized objective measurements and the statistical or numerical analysis of data collected through questionnaires and surveys. It sought to assess the level of knowledge, skills and competence in operating the lathe machine.

The population of the study was composed of selected marine engineering students at the University of Perpetual Help System Laguna. The total population of second- year and third-year marine engineering students was determined from the enrolment list with a total of 81. The actual sample size was 41 comprising 50% of the total population. According to Dovetail (2023) descriptive research, 20% to 50% of the total population can be used as the sample size.

The researchers used a self-made survey questionnaire consisting of three parts: Part 1 dealt with the respondents' level of knowledge on lathe machine with a Cronbach Alpha of 0.902 indicates excellent internal consistent and can be considered highly reliable; Part 2 covered their level of skills which has a Cronbach Alpha value of 0.899 which shows very good reliability; Part 3 was the level of competence with a Cronbach Alpha of 0.890 showing strong internal consistency and reliability for assessing. Since the questionnaire was non-standardized, it was subjected to the face and content validity and Cronbach Alpha reliability test. It was presented to a panel of experts in maritime education, research, and statistics for feedback and suggestions. The validity and reliability of the research instrument was enhanced by incorporating feedback from a panel of experts. The validation process for the data collection instruments aimed to make them clear and precise.

Weighted Mean was used to determine the respondents' (a) level of knowledge, (b) level of skills, and (c) level of competence in the lathe machine. The result of the weighted mean was interpreted using the Likert scale. Pearson r was used to determine if there is a significant relationship between the respondents' (a) level of knowledge, (b) level of skills, and (c) level of competence in lathe machine operations.

Results and Discussion

1. The Respondents' Level of Knowledge on Lathe Machine Operation

Table 1

Respondents' Level of Knowledge on Lathe Machine Operation

Indicator	Weighted Mean	Verbal Interpretation	Rank
1. the safety operating procedures in the lathe machine.	3.75	Very High (SA)	5
2. the function of the Turning process.	3.80	Very High (SA)	3
3. the maintenance and repair of the lathe machines	3.65	Very High (SA)	9
4. the techniques and strategies in using the lathe machine.	3.68	Very High (SA)	7.5
5. the various functions of a carriage for the operation of the work.	3.68	Very High (SA)	7.5
6. the different centre to be used on a lathe machine.	3.63	Very High (SA)	10
7. the different kinds of lathe machines.	3.70	Very High (SA)	6
8. the different kinds of holding devices used in lathe machine	3.60	Very High (SA)	11
9. the importance of using Personal Protective equipment (PPE) during Lathe machine operation	3.78	Very High (SA)	4
10. the proper alignment and setting of cutting tools in Lathe machine operation.	3.90	Very High (SA)	1
11. the function and usage of the tailstock in supporting workpieces.	3.55	Very High (SA)	12
12. the safety procedures in the Lathe machine.	3.83	Very High (SA)	2
Average	3.71		

As shown in the table, the highest-rated rank is "the proper alignment and setting of cutting and skill in properly aligning and setting cutting tools, which is a fundamental aspect of ensuring accurate machining operations. This finding aligns with Gibson (2019), who emphasized that proper tool alignment minimizes errors and improves machining precision, confirming that students or operators with sufficient practice are more competent in this area. The second highest indicator is "the safety operating procedures in the Lathe machine", obtaining a weighted mean of 3.83 and ranking second. This suggests that respondents are well-informed about the importance of safety measures when operating a lathe machine. This supports Del Rosario (2021), who stated that adherence to safety standards significantly reduces workplace accidents and fosters a culture of responsibility among machine operators. Ranked third is "the function of the turning process", with a weighted mean of 3.80, which also gained a Very High interpretation. This indicates that respondents have a clear understanding of how the turning process functions in shaping and machining materials. The finding supports Santos and Dela Cruz (2020), who highlighted that mastering the turning process is essential for producing accurate cylindrical parts and maintaining work efficiency in machining tasks.

On the other hand, the lowest three indicators reveal areas where respondents may need further improvement. Ranking tenth, "the different centre to be used on a lathe machine" obtained a weighted mean of 3.63. Despite being interpreted as "Very High," the lower mean compared to others implies a relatively lesser familiarity with the types and uses of centers. This could be due to limited hands-on exposure, as Lopez (2020) pointed out that understanding various centers requires practical demonstration beyond theoretical knowledge. The eleventh indicator, "the different kinds of holding devices used in the lathe machine", scored 3.60, suggesting that respondents are moderately confident but not fully proficient in identifying or using these devices.

This finding may contradict Reyes (2018), who emphasized that the ability to choose appropriate holding devices is a key indicator of machine operation competency. Finally, the lowest-ranked indicator, "the function and usage of the tailstock in supporting workpieces", received a weighted mean of 3.55. This implies that respondents may have limited understanding or practice regarding the role of the tailstock, which is crucial for securing long workpieces. The result supports Perez (2019), who found that students often overlook tailstock operations due to their focus on cutting tools and main spindle functions.

2. The Respondents' Level of Skills on Lathe Machine Operation

Table 2
Respondents' Level of Skills on Lathe Machine Operation

Indicator	Weighted Mean	Verbal Interpretation	Rank
1. controlling the rotating speed of the lathe machine.	3.83	Very High (SA)	1
2. feeding the tool perpendicular to the axis of rotation of the work.	3.65	Very High (SA)	7
3. cutting the internal surface to precise dimensions.	3.60	Very High (SA)	9
4. operating tailstock to support the metal work of the lathe.	3.55	Very High (SA)	10
5. operating the headstock for the operation of the work.	3.75	Very High (SA)	3
6. accurately setting up the workpiece on the lathe machine before operation.	3.68	Very High (SA)	5.5
7. selecting and using the appropriate cutting tool for different machining operations.	3.63	Very High (SA)	8
8. performing facing operations to achieve smooth and flat surfaces.	3.70	Very High (SA)	4
9. maintaining correct alignment between the centers, tool post, and tailstock.	3.68	Very High (SA)	5.5
10. observing proper safety practices while operating the lathe machine.	3.78	Very High (SA)	2
Average	3.68		

The research was considering the questionnaire as the most effective and more efficient data gathering instrument The first ranked, "controlling the rotating speed of the lathe machine," with a weighted mean of 3.83, shows that respondents are highly skilled in adjusting and managing machine speed is supports Lopez (2020), who emphasized that proper speed control ensures precision, surface finish and tool longevity. Ranked second is "observing proper safety practices while operating the lathe machine," with a weighted mean of 3.78. This indicates that respondents strongly follow safety measures, supporting Del Rosario (2021), who stated that safety Awareness minimizes accidents and promotes discipline in machine operations. The third ranked, "operating the headstock for the operation of the work," scored 3.75, suggesting that respondents are competent in using the headstock to control workpiece rotation. This aligns with Gibson (2019), who noted that headstock proficiency is essential for achieving stability and accuracy. On the other hand, the eighth rank, "selecting and using the appropriate cutting tool for different machining operations," with a weighted mean of 3.63, suggests limited proficiency in tool selection. This contrasts with Reyes (2018), who emphasized that proper tool choice is vital for efficient machining. The ninth rank, "cutting the internal surface in precise dimensions," with a weighted mean of 3.60, indicates that respondents need improvement in performing precise internal cuts. This supports Santos (2020), who found that internal cutting requires higher skill and consistent practice. The rank tenth, "operating tailstock to support the metal work of the lathe," obtained a weighted mean of 3.55, showing that respondents are less confident in using the tailstock effectively. This agrees with Perez (2019), who observed that learners often overlook the tailstock's role in supporting long workpieces.

3. The Respondents' Level of Competence on Lathe Machine Operation

Table 3
Respondents' Level of Competence on Lathe Machine Operation

Indicator	Weighted Mean	Verbal Interpretation	Rank
1. I can operate the lathe machine confidently without constant supervision.	3.80	Very High (SA)	1
2. I can be able to complete lathe operations within the required time.	3.70	Very High (SA)	6.5
3. I can consistently produce accurate outputs that meet given specifications.	3.65	Very High (SA)	8
4. I can be competent in handling different types of workpieces on the lathe.	3.60	Very High (SA)	9.5
5. I can safely perform complex lathe operations when needed.	3.70	Very High (SA)	6.5
6. I can adapt to unexpected problems during lathe operation.	3.73	Very High (SA)	4
7. I am confident in applying proper techniques to achieve precise results.	3.73	Very High (SA)	4
8. I can perform various operations (facing, turning, drilling, threading) effectively.	3.73	Very High (SA)	4
9. I can manage the lathe machine while following safety standards at all times.	3.60	Very High (SA)	9.5
10. I can work independently on lathe projects from start to finish.	3.75	Very High (SA)	2
Average	3.70		

The highest-rated indicator, "I can operate the lathe machine confidently without constant supervision," with a weighted mean of 3.80, indicates that respondents are highly confident and capable of performing machine operations independently. This supports Gibson (2019), who stated that confidence in operating machinery is a sign of practical competence and adequate training exposure. Ranked second, "I can work independently on lathe projects from start to finish," obtained a weighted mean of 3.75. This shows that respondents can perform machining tasks with minimal assistance, aligning with Lopez (2020), who emphasized that independent work demonstrates both technical knowledge and problem-solving ability.

The third indicators, "I am confident in applying proper techniques to achieve precise results,", "I can adapt to unexpected problems during lathe operation" also "I can perform various operations (facing, turning, drilling, threading) effectively." with a weighted mean of 3.73, reveals that respondents are skilled in applying correct machining methods. This supports Santos (2020), who highlighted that mastery of machining techniques leads to higher accuracy and quality outputs. Meanwhile, the eighth indicator, "I can consistently produce accurate outputs that meet given specifications," gained a weighted mean of 3.63, suggesting that respondents are competent but may still lack full consistency in meeting precise standards. This finding supports Perez (2019), who noted that consistent accuracy develops through continued practice and precision training. Lastly, the lowest-ranked indicators, "I am competent in handling different types of workpieces on the lathe" and "I can manage the lathe machine while following safety standards at all times," both with a weighted mean of 3.60, indicate that respondents have a positive attitude toward safety and versatility but still need more hands-on experience. This aligns with Del Rosario (2021), who emphasized that constant exposure to different materials and adherence to safety protocols enhance operator proficiency.

4. Relationship between the Respondents' Level of Knowledge and Level of Skills in Lathe Machine Operation

	Pearson r	p-value	Interpretation
The Respondents' Level of Knowledge and Level of Skills in Lathe Machine Operation	0.402* Moderate correlation	0.010	Significant
*Significant @ 0.05			

Table 4 shows a Pearson r value of 0.402 with a p-value of 0.010, indicating a moderate positive correlation between the respondents' level of knowledge and their level of skills in operating the lathe machine. Since the p-value is less than 0.05, the relationship is considered significant. This means that as the respondents' knowledge about lathe machine operation increases, their skills in performing machine tasks also tend to improve.

5. Relationship between the Respondents' Level of Knowledge and Level of Competence in Lathe Machine Operation

	Pearson r	p-value	Interpretation
The Respondents' Level of Knowledge and Level of Competence in Lathe Machine Operation	0.312 Low correlation	0.050	Not Significant
Significance level @ 0.05			

Table 5 shows a Pearson r value of 0.312 with a p-value of 0.050, indicating a low correlation between knowledge and competence. Because the p-value is equal to 0.05, the relationship is interpreted as not significant. This suggests that having knowledge alone does not necessarily guarantee that students will demonstrate high competence in actual lathe machine operation.

6. Relationship between the Respondents' Level of Skills and Level of Competence in Lathe Machine Operation

	Pearson r	p-value	Interpretation
The Respondents' Level of Skills and Level of Competence in Lathe Machine Operation	0.541** Moderate correlation	0.000	Significant
**Significant @ 0.01			

Table 6 reveals a Pearson r value of 0.541 with a p-value of 0.000, showing a moderate positive correlation between skills and competence. Since the p-value is less than 0.01, the relationship is highly significant. This means that the higher the respondents' actual skills in using the lathe machine, the higher their competence level is likely to be.

Conclusions

Based on the findings of the study, the study conclusions were drawn. The respondents' level of knowledge in lathe machine operation is very high. The respondents' level of skills in lathe machine operation is very high. The respondents' level of competence in lathe machine operation is very high. Knowledge does influence skills, meaning that when respondents understand how the machine operates and the correct procedures, they are more capable of performing lathe tasks effectively. Knowledge alone does not ensure competence. If the respondents understand the concepts, they still require hands-on practice to perform tasks with accuracy and confidence. Skills have the greatest impact on competence. Competence improves when the respondents apply techniques repeatedly through actual operation and guided practice.

Future Direction

Based on the results of the study, the following recommendations were offered: These Based on the above findings and conclusions, the following recommendations are hereby given: Although maritime students had a high level of knowledge on lathe machines, they should continue attending training and seminars to be updated with the latest regulations. Maritime students must be continuously motivated with enthusiasm to maintain their knowledge of lathe machine applications when they are on board as seafarers. The researchers also recommend including other fluctuating events that were not covered in the study, such as PMS (Planned Maintenance System). This recommendation may lead future researchers to replicate this study utilizing different research designs and have a higher understanding in lathe machine operation.

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IMPACT OF SAFETY TRAINING, RISK AWARENESS, AND EMERGENCY PREPAREDNESS ON CRISIS RESPONSE SKILLS OF MARITIME STUDENTS

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Abstract

This study examined the impact of safety training, risk awareness, and emergency preparedness on the crisis response skills of maritime students at the University of Perpetual Help System Laguna. Using a quantitative, non-experimental descriptive-correlational design, data were collected from maritime students in the College of Maritime Education through a validated survey questionnaire and analyzed using appropriate statistical tools. Findings revealed that respondents demonstrated adequate levels of safety training, risk awareness, and emergency preparedness. However, no significant relationships were found between these variables and crisis response skills. This indicates that, although students possess sufficient safety-related knowledge and preparedness, these factors do not independently influence their ability to respond effectively during crises. The study concludes that a more integrated training approach is needed to strengthen maritime students' crisis response skills.

Keywords: Crisis response skills, Emergency preparedness, Maritime students, Risk awareness, Safety Training

Introduction

In recent years, the importance of safety and preparedness within the maritime industry has gained significant attention due to the increasing complexity of maritime operations and the inherent risks associated with seafaring. Maritime students, who are the future workforce of the industry, must be equipped with the necessary skills to effectively handle emergencies and crises. A critical aspect of their training involves safety training, risk awareness and emergency preparedness, which both are vital to ensuring their ability to respond effectively during high-pressure situations.

Safety training risk awareness refers to the structured learning and hands-on experience aimed at providing individuals with the knowledge and skills to identify, mitigate, and manage potential hazards, which includes the ability to recognize, evaluate, and respond to potential dangers before they escalate. It involves a proactive approach, enabling students to foresee risks and make informed decisions to prevent accidents. In the words of Wrobel (2021), human factors contribute to errors and mistakes which cause severe maritime accidents. It is, therefore, essential to analyze human factors in maritime operations for safety at sea (Chauvin et al., 2023).

Emergency preparedness involves the readiness to act in an emergency, including the development of response plans, simulations, and drills that equip individuals with the practical skills necessary to respond quickly and effectively in real-life crisis situations in both natural and man-made disasters. It refers to actions and measures introduced before the onset of an emergency to improve the effectiveness, efficiency, timeliness and accountability of emergency responses to save lives and provide protection. According to Afenyo, et al., (2022), the need for proper preparedness in anticipation of potential accidents and/or incidents is becoming increasingly important as anticipated growth in economic activities related to maritime shipping (movement of goods) and transportation (movement of people) within the Canadian Arctic continues with projections of ongoing climate and economic change.

In light of this, exploring the relationships between safety training risk awareness and emergency preparedness is crucial for understanding their combined impact on maritime students' crisis response skills. By analyzing how these factors interact, this study aims to provide valuable insights into the effectiveness of current maritime education and training programs. The results will help identify the strengths and weaknesses of existing curricula, offering recommendations for improvements in teaching methods and content delivery. Additionally, understanding the role each factor plays in crisis management will allow for more tailored and targeted training approaches, ensuring that students are better equipped to respond to a wide range of maritime emergencies. Ultimately, this research will contribute to refining safety protocols, enhancing preparedness strategies, and fostering a stronger safety culture within the maritime industry, thereby improving both individual and collective crisis response capabilities in real-world maritime settings.

Methods

This study employed quantitative non-experimental descriptive correlational research design which allows the researchers to aim and give a glimpse of the current situation and identify correlations between variables and to enable the prediction of future events using knowledge from the past. (Stanger, 2020).

There are 250 respondents currently in the College of Maritime Education from 1st year to 3rd year. The researchers used this method as their foundation in obtaining the required number of College of Maritime Education Students from the University of Perpetual Help System for the study.

In gathering data, the researchers utilized a printed questionnaire in which respondents can select their answers to questions by writing their answers. The questionnaire was divided into four parts: Scale 1 covered the Safety Training and Crisis Response Skills of the respondents. Scale 2 covered the Risk Awareness and Crisis Response Skills of the respondents. Scale 3 covered the Emergency Preparedness and Crisis Response Skills of the respondents and Scale 4 covered the Relationship between Safety Training, Risk Awareness, Emergency Preparedness, and Crisis Response Skills of the respondents.

Weighted mean, and standard deviation were used to measure the level of Safety Training, risk awareness, and emergency preparedness of the respondents. Weighted mean, and standard deviation were used to measure the level of Crisis Response Skills of the respondents. Pearson-r was utilized to determine the relationship between the respondents' Safety Training, Risk Awareness, and Emergency Preparedness and their Crisis Response Skills.

Results and Discussions

Table 1. Safety Training on Crisis Response Skills

Variables	Mean	Verbal Interpretation	Rank
1. Safety training prevents accidents.	3.15	High (A)	2
2. Enhances ability to respond to emergencies.	3.02	High (A)	7.5
3. Provide enough information about hazards.	3.08	High (A)	6
4. Drills prepare for real emergencies.	3.13	High (A)	3
5. Understands impotence of safety procedures.	3.10	High (A)	4.5
6. Covered the use of life saving appliances.	3.10	High (A)	4.5
7. Safety training should be continuous.	3.02	High (A)	7.5
8. Instructors were effective in delivering training.	2.99	High (A)	10
9. Proper procedures for accident reporting.	3.01	High (A)	9
10. Made me more aware of job-related risks.	3.17	High (A)	1
Overall Mean	**3.08**	**High (A)**	

The overall weighted mean of **3.08** shows that students generally believe safety training plays an important role in shaping their crisis response skills. The highest score (**3.17**) reflects that the practical aspects of the program—such as drills and hands-on demonstrations—are what students find most useful. These activities tend to build confidence and improve situational judgment, a finding also noted in studies on simulation-based maritime training (Corpuz et al., 2025; Khorram-Manesh et al., 2025).

The lowest rating (**2.99**) suggests that some parts of the training may be less engaging or not reinforced frequently enough. This issue has been observed in other safety programs where uneven instruction reduces retention and overall impact (Al Thobaity et al., 2022).

Overall, the results show that while the students value their safety training, they would benefit from more consistent, updated, and practical training sessions (Cho & Park, 2020).

Table 2. Level of Risk Awareness on Crisis Response Skills

Variables	Mean	Verbal Interpretation	Rank
1. Aware of risks in ballast tanks.	3.04	High (A)	8
2. Identifies hazards in ship areas.	3.12	High (A)	4
3. Understands importance of risk assessments.	3.14	High (A)	2.5
4. Aware of risks from heavy machinery.	3.03	High (A)	9
5. Regular risk training is essential.	3.01	High (A)	10
6. Familiar with safety equipment.	3.14	High (A)	2.5
7. Aware of faulty firefighting risks.	3.06	High (A)	7
8. Proactive in reporting hazards.	3.08	High (A)	5.5
9.Communicates safety concerns effectively.	3.18	High (A)	1
10. Knows how to report near misses.	3.08	High (A)	5.5
Overall Mean	**3.09**	**High (A)**	

The overall mean of **3.09** indicates a generally steady level of risk awareness among the respondents. The highest rating (**3.18**) shows that students feel confident in identifying hazards and communicating possible risks—skills that are closely tied to good situational awareness in maritime settings (Khorram-Manesh et al., 2025).

However, the lower score (**3.01**) for the importance of regular risk training suggests that while students can recognize hazards, they may not fully appreciate the need for ongoing risk assessment practice. Similar patterns appear in studies where learners understand obvious dangers but have difficulty evaluating less visible or unexpected risks without structured training (Lokmic et al., 2023; Pambudi et al., 2021).

Overall, students show a healthy awareness of daily risks but would benefit from more advanced and frequent risk-evaluation exercises.

Table 3. Emergency Preparedness on Crisis Response Skills

Variables	Mean	Verbal Interpretation	Rank
1. Aware of emergency procedures.	2.99	High (A)	10
2. Follow emergency protocols during drills.	3.16	High (A)	2.5
3. Knows what to do during a fire.	3.12	High (A)	5
4. Uses life-saving appliances properly.	3.06	High (A)	8
5. Confident in remaining calm.	3.14	High (A)	4
6. Knows basic first aid.	3.10	High (A)	6.5
7. Pay attention during safety briefings.	3.10	High (A)	6.5
8. Aware of enclosed space dangers.	3.16	High (A)	2.5
9. Prepared to assist passengers and crew.	3.20	High (A)	1
10.Believes continuous training is essential.	3.01	High (A)	9
Overall Mean	**3.10**	**High (A)**	

With an overall mean of **3.10**, the respondents show a moderate high level of readiness for emergency situations. The highest rating (**3.20**) reflects strong confidence in assisting passengers and crew—an ability commonly strengthened through repeated drills and simulated emergency exercises (Corpuz et al., 2025).

On the other hand, the lowest score (**2.99**) for awareness of emergency procedures suggests that some protocols may not be regularly reinforced. Prior research shows that while drills enhance confidence, procedural memory fades unless reviewed and practiced consistently (Cho & Park, 2020; Bentley et al., 2019).

These results imply that students possess functional emergency skills but need more frequent exposure to basic procedural reviews to ensure consistent performance across all emergency tasks.

Table 4
Relationship between the Impact of Safety Training and Level of Risk Awareness on Maritime Students Crisis Response Skills

	Pearson r value	p-value	Interpretation
Safety Training & Risk Awareness	0.087	0.170	No Significant Relationship
**Significant @ 0.01			

The correlation between safety training and risk awareness resulted in a Pearson r value of 0.087, which indicates a negligible positive correlation. This means that although both variables relate to maritime safety, improvements in safety training do not necessarily correspond to improvements in risk awareness.

The p-value of 0.170, which is higher than the 0.05 significance level, confirms that the relationship is not statistically significant. Therefore, the level of safety training received by students does not predict or influence how aware they are of potential risks. This suggests that risk awareness may develop independently through personal judgment, exposure, or experience rather than from training alone.

Table 5
Relationship between Safety Training and Emergency Preparedness on Maritime Students Crisis Response Skills

	Pearson r value	p-value	Interpretation
Safety Training & Emergency Preparedness	-0.077	0.224	No Significant Relationship
**Significant @ 0.01			

In Table 5, the relationship between safety training and emergency preparedness yielded a Pearson r value of –0.077, indicating a negligible negative correlation. This means that increases in safety training do not equate to increased preparedness, and in fact, the direction of the relationship is slightly opposite, although too small to be meaningful.

The p-value of 0.224 shows that the correlation is not statistically significant, further indicating that safety training does not strongly influence how prepared students feel or act in emergencies.

This outcome may reflect that safety training alone is not enough to build preparedness. Preparedness is often better developed through hands-on drills, real-life simulations, and repeated practice, rather than theoretical or classroom -based training.

Table 6
Relationship between Risk Awareness and Emergency Preparedness on Maritime Students Crisis Response Skills

	Pearson r value	p-value	Interpretation
Risk Awareness and Emergency Preparedness	0.003	0.963	No Significant Relationship
**Significant @ 0.01			

The relationship between risk awareness and emergency preparedness shows a Pearson r value of 0.003, which is extremely close to zero, indicating no measurable correlation between the two variables.

The high p-value of 0.963 shows the result is far from significant, meaning risk awareness has virtually no statistical relationship with emergency preparedness among the respondents. This means that even if a student can recognize hazards or identify risky conditions, it does not guarantee that they are ready, trained, or confident enough to respond effectively in an emergency.

Preparedness, in this case, seems to depend more on practical exposure, drills, and actual response training, rather than awareness alone.

Conclusion

Safety training has a moderate influence on students' crisis response skills. Although students agree that safety training is helpful, its impact is not strong enough to show significant statistical relationships with the other variables. This suggests that training may need more intensive hands-on application and consistency. Risk awareness contributes to students' crisis understanding but does not directly raise their preparedness. Students can identify risks, yet their ability to translate awareness into action is limited, resulting in no significant correlation with preparedness levels. Emergency preparedness is present but not fully developed. Students feel confident with commonly practiced emergency tasks, but their overall. preparedness remains moderate, showing the need for more comprehensive and realistic training drills. The negligible correlation among all variables implies that they develop independently. Safety training, risk awareness, and emergency preparedness do not reinforce one another as expected. Each grows separately, indicating a gap in curriculum integration. The overall findings highlight the importance of aligning maritime education components. Since the variables are not significantly connected, there is a strong need for integrated and sequential training programs that link safety training, hazard recognition, and practical emergency procedures into one cohesive system.

Future Directions

Based on the findings, **t**he Maritime students should practice positive emotion, moods, thoughts and to have positive mental well-being for them to manage the negative thoughts when the situation is arising. Be more resMaritime students should actively participate in safety training programs to enhance their practical knowledge and crisis response abilities during emergency situations. Maritime students should continuously improve their awareness of maritime risks and hazards by engaging in regular discussions, drills, and safety-related activities. Maritime students should develop preparedness habits by familiarizing themselves with emergency procedures, safety protocols, and evacuation plans. Maritime institutions should strengthen the implementation of safety training programs by providing updated equipment, realistic simulations, and hands-on emergency exercises. Maritime institutions should integrate risk awareness and emergency preparedness topics more comprehensively into the maritime curriculum to improve students' crisis management competencies. Maritime institutions should conduct regular seminars, workshops, and emergency drills to reinforce students' confidence, discipline, and readiness during crisis situations. Instructors and training officers should encourage active participation and teamwork during safety drills to improve decision-making and communication skills among maritime students. Future studies should include a larger and more diverse group of maritime students from different maritime institutions to increase the reliability and generalizability of the findings. Future researchers should examine other factors that may influence crisis response skills, such as leadership, stress management, and prior emergency experiences. Future studies may use qualitative research methods, such as interviews or focus group discussions, to gain deeper insights into the experiences and perceptions of maritime students regarding safety training, risk awareness, and emergency preparedness.

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CHALLENGES ENCOUNTERED AND PERSONAL GROWTH DURING SHIPBOARD FAMILIARIZATION OF SELECTED MARITIME STUDENTS OF THE UNIVERSITY OF PERPETUAL HELP SYSTEM LAGUNA

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Abstract

The state of an individual's mental health significantly impacts overall wellbeing and performance, particularly in demanding environments such as shipboard familiarization for maritime students. This study examined the challenges encountered and personal growth experienced by selected maritime students of the University of Perpetual Help System Laguna during their familiarization period. Using a descriptive-correlational design, data were collected through survey questionnaires from students who had completed the program. Findings showed that most respondents were second-year BS Marine Engineering students. Overall, respondents disagreed that they experienced challenges such as loneliness and isolation, likely due to the short duration of the familiarization. They also disagreed that the experience significantly enhanced their awareness of real ship operations and decision-making skills. Statistical analysis revealed no significant differences in challenges or personal growth when grouped by profile variables, and no significant relationship between the two. The study concludes that while students did not experience major emotional challenges onboard, their personal growth and practical knowledge remained limited during shipboard familiarization.

Keywords: Maritime challenges, Maritime students, Mental health, Personal growth, Shipboard familiarization

Introduction

The marine industry involves logistics, transporting goods, and passengers across international borders enabling effective connection economically and socially acting as the "backbone" of social trade and acts as a key factor of economic growth globally (Capt. Nigam P., 2023). In addition, PrimoNautic (2022) state that the marine industry is a critical component of the global economy responsible for the movement of more than 90% of the world's trade. It includes shipping and ports, terminals, shipbuilding, and all associated services that facilitate global trade.

According to Wahyudi Santos (2023) Shipboard Familiarization is the act of teaching maritime students about the necessary information about the ship's safety equipment and work procedures as well as the potential dangers that may occur including alarm task actions dealing with these distress situations. It's a hands-on experience that engages students in the operational realities of a seafarer's life. This experience provides an opportunity to bridge the gap between theoretical learning and practical application to provide insight into the challenges faced by maritime personnel on a daily basis.

In addition, teaching maritime students and necessary information about the ship, emergency procedures, individual roles, safety equipment, etc. to lessen property damage and to prevent further accidents from happening that is very crucial. It is a hands-on experience that engages students in the operational realities of a seafarer's life. This experience provides an opportunity to bridge the gap between theoretical learning and practical application providing insights into the challenges faced by maritime personnel on a daily basis.

A vessel, regardless of its purpose and displacement, is a high-risk area that exposes seafarers to a high diversity of safety and security risks, such as potential occupational accidents, disasters and piracy, that is why given special attention is given to occupational safety on ships. Marzo (2023) states that injuries in ships have always been a pressing issue and remain an urgent problem today: no matter how the shipping industry changes, no matter what technological innovation ships are equipped with, sailors still suffer severe injuries and die onboard. That is why international maritime regulations require that all personnel employed or engaged on a seagoing ship receive proper familiarization training (Tvedt S, n.d). All this has a significant impact on the challenges involved in ship familiarization.

Additionally, seafarers' difficulties are impacted by homesickness during ship familiarization. Schmied (2023) reports that homesickness is a common issue among marine engineering students. Maritime students are exposed to the harsh realities of life at sea during ship familiarization which frequently entails becoming acquainted with all shipboard equipment and safety procedures, being away from loved ones, and being subjected to difficult physical conditions including noise and vibration. In addition, Britannia (2023) highlights how important it is to treat homesickness for maritime students' mental health and handle feeling alone and away from family. Moreover, the competence developed when maritime students focus on their performance, the perceived factors that affect their capability, and the challenges to students during shipboard familiarization are compromised due to these factors (Derecho 2024).

Furthermore, any vessel – regardless of its purpose and displacement, is a high-risk area, and therefore special attention is paid to occupational safety on ships, According to Melnyk (2023) Knowledge and compliance with occupational safety and health standards and regulations is required during any production process on board or during routine operations necessary to ensure the vessel's proper functioning in accordance with its intended purpose.

Methods

The researchers used a descriptive-correlational research approach. Descriptive correlational research as defined by Singh (2023) is a method that observes and documents a group while analyzing relationships between variables. In this study, it was used to determine the challenges encountered during shipboard familiarization and the personal growth in terms of experience and knowledge with the aimed to evaluate and discover the importance, effectiveness, and effects of shipboard familiarization among maritime students by focusing on their day to day experiences and challenges that they may have encountered and how these things contributes to their personal growth as they transition from academics to real-world maritime operations.

The population of the study was composed of selected maritime students at the University of Perpetual Help Systems Laguna. The sample population was made up of two hundred fifty-three (253) second-year students and one hundred seventy-four (174) third-year students. In this investigation, the stratified random sampling techniques were applied. For descriptive research, 20% to 30% of the total population can be used as the sample size (Althubaiti, 2023). The researchers got 20% of the total population of the second year and third year enrolled in the program composed of 86 maritime students.

The researchers used a survey questionnaire for the purpose of collecting the needed primary data. A survey questionnaire was divided into 3 parts. Part 1 was the profile of the respondents; Part 2 was the challenges encountered during shipboard familiarization; and Part 3 dealt on personal growth in shipboard familiarization. To ensure the reliability and validity of the questionnaire it was subjected to face and content validity and Cronbach Alpha reliability test, It was shown to a panel of experts in the field of maritime education, research and statistics. After some modifications as suggested by the panel of experts, it was presented to the research adviser for final approval. The reliability of the questionnaire was established by Cronbach Alpha coefficient which gave a result of 0.837 for challenges and 0.808 for personal growth.

Frequency and percentages were used to determine the profile of the respondents. Weighted mean was used to determine the challenges encountered during shipboard familiarization by the respondents and their personal growth. t-test was used to determine the significant difference in the challenges encountered by the respondents during shipboard familiarization and their personal growth when grouped according to profile variables. Pearson-r coefficient was utilized to determine the relationship between the challenges encountered by the respondents during shipboard familiarization and their personal growth.

Results and Discussions

1. The Profile of the Respondents

Table 1
The Profile of the Respondents

Profile	Frequency	Percentage
Year Level 2nd year	51	59.30
3rd year	35	40.70
Degree Program		
BSMT	40	46.51
BSMARE	46	53.49
Total Number of Respondents: 86		

Table 1 shows the profile of 86 respondents. The majority (59.30%) were 2nd -year level, while (40.70%) were 3rd year level. Most of the respondents (53.49%) were taking Bachelor of Science in Marine Engineering (BSMARE), while (46.51%) were from the Bachelor Science in Marine Transportation (BSMT). This indicates that a greater number of engineering students participated in the shipboard familiarization during the study period.

2. The Challenges Encountered by the Respondents during Shipboard Familiarization

Table 2

The Challenges Encountered by the Respondents during Shipboard Familiarization

Indicator	Weighted Mean	Verbal Interpretation	Rank
1. Seasickness or fatigue interfered with my ability to focus on task.	1.99	Disagree	7
2. Applying my school knowledge to shipboard task is challenging.	1.87	Disagree	9
3. I felt homesick while away from my family.	2.11	Disagree	5
4. Adapting to the food and lifestyle on board is difficult to me.	2.17	Disagree	4
5. Lack of rest and recovery time affected my emotional stability.	1.95	Disagree	8
6. I experienced loneliness or isolation while on board.	2.31	Disagree	1
7. The lack of rest affected my alertness and productivity.	2.00	Disagree	6
8. Experiencing difficulties positively influenced my attitude towards continuous learning.	1.82	Disagree	10
9. I felt unprepared for the strict safety drills and emergency procedures on board.	2.30	Disagree	2
10. The overall shipboard environment was stressful and overwhelming.	2.28	Disagree	3
Average	**2.08**	**Disagree**	

As shown in the table, the respondents disagreed that they experience challenges during shipboard familiarization as revealed in the average weighted mean of 2.08. The respondents disagreed that they experienced loneliness or isolation while onboard (x=2.31); felt unprepared for the strict safety drills and emergency procedures onboard (x=2.30). The respondents also disagreed that the overall shipboard environment for them was stressful and overwhelming (x=2.28).

In addition, the respondents disagreed that lack of rest and recovery time affected their emotional stability (x=1.95), applying their school knowledge to shipboard task in challenging (x=1.87), and experiencing difficulties positively influenced their attitude towards continuous learning (x=1.82).

These findings contrasted with Serbusa and Dunder (2024) who explored and brought to understand seafarers loneliness as mediating variable between psychological well-being and resilience, and tests resilience as a mediating variable between psychological well-being loneliness. Tac B. et al (2020) investigated the performance influence factors on shipboard drills to improve ship emergency preparedness at sea among shipboard familiarization. Svetina et al. (2024) assessed perceived stressors and their impact using the Symptom Checklist (SCL-90) that focuses on depression, anxiety, hostility, interpersonal sensitivity, and somatization.

4. Difference in the Challenges Encountered by the Respondents during Shipboard Familiarization when grouped according to Profile Variables

Table 4

Difference in the Challenges Encountered by the Respondents during Shipboard Familiarization when grouped according to Profile Variables

Profile	T-test	p-value	Interpretation
Year level	0.049	0.961	Not Significant
Degree program	-0.348	0.728	Not Significant
Significance level @ 0.05			

Table 4 shows the statistical difference in the challenges encountered by the respondents during shipboard familiarization when grouped according to profile variables. The result revealed that both year level and degree programs obtained p- value greater than 0.059 (0.961 and 0.0728), which indicates no significant difference. This means that the challenges experienced by the respondents was the same regardless of whether they were 2nd-year or 3rd-year, or whether they belonged to BSMT or BSMARE programs. It can be concluded that the challenges faced during shipboard familiarization are common and universal experiences among the maritime students. Additionally, Sandoval & Luste (2021) reported that year level does not significantly influence the type or intensity of challenges encountered during shipboard familiarization. Even cadets with differing academic standing face similar adjustment issues because the onboard environment presents new, real-life maritime conditions that are not fully dependent on classroom learning.

5. Difference in the Respondents' Personal Growth in Shipboard Familiarization when grouped According to Profile Variables

Table 5

Difference in the Respondents' Personal Growth in Shipboard Familiarization when grouped According to Profile Variables

Profile	t-test	p-value	Interpretation
Year Level			
Experience	0.911	0.366	Not Significant
Knowledge	1.553	0.126	Not Significant
Degree Program			
Experience	1.777	0.079	Not Significant
Knowledge	1.759	0.083	Not Significant
Significance level @ 0.05			

Table 5 revealed that there is no significant difference in the respondents' personal growth during shipboard familiarization when grouped according to year level and degree program. The probability values of 0.366 and 0.126 for year level;

0.079 and 0.083 for degree program were all greater than the 0.05 significance level. This means that regardless of their year level and degree program the respondents have the same view of their personal growth in shipboard familiarization. According to Guzman & Santos (2020), personal growth during shipboard familiarization is influenced mainly by the ship environment itself including exposure to real-life maritime operations, multicultural crews, and high- pressure working conditions rather than differences in student background or program.

6. Relationship between the Challenges Encountered by the Respondents during Shipboard Familiarization and their Personal Growth

Table 6

Relationship between the Challenges Encountered by the Respondents during Shipboard Familiarization and their Personal Growth

Personal Growth	Pearson r value	p-value	Interpretation
Experience	0.213 Low correlation	0.053	Not Significant
Knowledge	0.106 Low correlation	0.341	Not Significant
Significance level @ 0.05			

As reflected in Table 6 there was no significant relationship between the challenges encountered by the respondents during shipboard familiarization and their personal growth. The probability values of 0.053 for experience and 0.341 for knowledge were greater than the 0.05 significance level. This means that the challenges encountered by the respondents have nothing to do with their personal growth during shipboard familiarization. EMSA (2020) also highlights that familiarization programs are designed to produce consistent outcomes despite variations in cadets' challenges.

Conclusion

Based on the findings of the study, the study conclusions were drawn: Majority of the respondents were 2nd year and taking BS Marine Engineering. The respondents disagreed that they encountered loneliness and isolation while on board. The respondents strongly disagreed that they became more aware of real ship operations and their decision-making skills were enhanced during shipboard familiarization. Challenges encountered during shipboard familiarization showed no significant differences among respondents, regardless of their profile variables. Personal growth during shipboard familiarization showed no significant differences among respondents, regardless of their profile variables. There was no significant relationship between the challenges encountered by the respondents during shipboard familiarization and their personal growth.

Direction for Future Use

Based on the above findings and conclusions, the following recommendations are hereby given: Students should participate in shipboard tasks, ask questions, and seek guidance to enhance learning and practical skills. Students should set learning and personal growth goals, monitor progress, and actively work on improving skills and handling challenges. Instructors should supervise students closely, give clear instructions, and offer feedback to help them handle shipboard tasks effectively. Future studies may explore additional factors, such as shipboard environment, mentorship quality, or student preparedness, to better understand what influences personal growth. Future researchers could study how shipboard familiarization impacts students' professional skills and personal development over a short period, beyond the immediate training.

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BRIDGE SIMULATOR TRAINING, LEARNING EFFICIENCY, AND PRACTICAL COMPETENCE OF MARITIME STUDENTS WITH COMPLETED CLASSROOM INSTRUCTION

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Abstract

This research explored the effects of Bridge Simulation Training (BST) on learning efficiency and practical competence among maritime students at the University of Perpetual Help System Laguna. Grounded in Situated Learning Theory and Experiential Learning Theory, the study examined how realistic simulation environments support the transfer of theoretical knowledge into practical navigational skills. A descriptive-correlational design was employed, using a face-validated and reliable questionnaire administered to students who underwent both classroom instruction and full bridge simulator training. Results indicated that students rated the impact of BST, learning efficiency, and practical competence as very high. They reported notable improvements in decision-making, situational awareness, confidence, knowledge retention, and application of theoretical concepts. Students also expressed strong confidence in navigation, emergency response, regulatory compliance, and teamwork. Correlation analyses revealed strong and statistically significant relationships among all variables. BST showed strong positive relationships with learning efficiency ($r = .869$) and practical competence ($r = .816$), while learning efficiency was very strongly correlated with practical competence ($r = .901$). Overall, the findings affirm BST as an effective instructional strategy that enhances maritime preparedness, skill mastery, and operational competence, with recommendations provided to further optimize simulation-based training.

Keywords: Bridge simulation training, Learning efficiency, Navigation skills, Operational competence, Situated learning theory

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Introduction

Maritime education highly demands people in charge who are not only capable of theoretical knowledge, but also have the capacity to apply these concepts onto real-life situations. MET's or Maritime Education and Training are at a race for improving their methods and ways to enhance student knowledge and situated application of training, from then only can it be called student competence in a said field. These are all deemed to be necessary for effective ship navigation and performance.

Bridge simulators offer a controlled, risk-free environment where students can experience realistic navigation and situations like emergencies, bridging the gaps between classroom instruction and real-world maritime operations. Some studies have shown that simulation-based training significantly improves students' learning efficiency and promotes practical competence, particularly in areas such as situational awareness, collaborative work, and ship handling (Lützhöft et al., 2017; Nazir et al., 2019). According to Teye and Seiler (2018), simulation allows for experiential learning, where trainees can repeatedly practice critical tasks and receive immediate feedback, leading to improved performance and confidence.

In a study of Steven (2019), the study supports the fact that Maritime Education is crucial in order to equip a future seafarer with the abilities, experience, and competencies needed to deal with all aspects of the shipping industry. One of the biggest developments in maritime training is Bridge simulators replicate real-time shipboard environments, allowing students to engage in hands-on learning experiences that mirror actual bridge operations. Through these simulated settings, students can practice emergency response, navigation, communication, and decision- making without the risks associated with real-life maritime scenarios.

As stated by Monahan-Picpican (2023) in her study "Full Mission Bridge Simulation: Basis for Skills and Competency Enhancement of BSMT Students", full mission bridge simulators significantly enhance the ability of students to maneuver ships and apply theoretical knowledge. The study found that simulation training led to higher achievement levels in areas such as ship familiarization and situational awareness, proving its efficacy in reinforcing both technical and soft skills. Since it promotes abilities, learning efficiency, and the level of practical competence, bridge simulation training has emerged as a key technological advancement for maritime students' education and training. This advanced teaching tool replicates real-world bridge and navigational operations, allowing students to participate completely and gain practical experience without the risks associated with real-world maritime operations.Additionally, Students are expected to learn through traditional structural systems which rely on theoretical training, however, this tends to leave out practical learning. Students are unprepared for tasks such as navigation, communication, or vessel maneuvering during emergencies. To deal with this gap, bridge simulation training has been developed to let students try out various maritime scenarios, thus making learning more engaging. As it relates to bridge simulation, the outcomes are observable in decision making, teamwork and communication during demanding situations, navigating with an appreciation of the nuances and complexities, and overall ship handling proficiency. In addition, there is a notable improvement in the learning outcomes owing to the continuous practice obtained from simulation exercises. Situations that are too numerous and complex to rehearse within a realistic time frame on actual vessels can be practiced over and over again in a simulator.

When it comes to practical skills, the bridge simulator allows students to tackle actual real-life challenges and test their theoretical knowledge. It helps in emerging problem solving techniques with self-assurance as one needs to appear confident towards his decision. The vessels also serve as pointers for refinement, which helps to increase performance and sharpen skills before.

Methods

The descriptive-correlational research design was used in this investigation. As stated by Bickman and Rog (2017), descriptive-correlational research is the ideal strategy for gathering information to illustrate correlations and describe the phenomena as it exist, and it is frequently conducted prior to an experiment to choose what precise variables to modify and include in the experiment. The study's design is suitable since it sought to ascertain how the impact of bridge simulation training, learning efficiency, and practical competence of selected maritime students are related to one another.

This study involved of total population of 96 selected Completed Classroom Instruction in who have already taken the full bridge simulator training in Bachelor of Science Marine Transportation students at the University of Perpetual Help System Laguna. In this investigation, the random sampling technique was applied. Out of the total population of 96 students, 35 participated and successfully completed the survey, thereby forming the final sample used for the study. The study population was chosen as these students were actively involved in maritime education and training, for which, by virtue, they were exposed to bridge simulation training as part of their educational program.

A self-made questionnaire was developed to gather data on the impact of bridge simulation training, learning efficiency, and practical competence of selected maritime students. The instrument was divided into three (3) parts. Part I deal with the respondents' impact of bridge simulation training. Part II covered the level of learning efficiency of the selected maritime students, and Part III focused on the level of practical competence of the respondents. The instrument underwent content validation by experts in the field of maritime education, research and statistics. The validators assessed the clarity, relevance, and appropriateness of each questionnaire item to ensure alignment with the study's objectives. Feedback from the validators were incorporated to refine and improve the instrument.

For the pilot testing phase, the questionnaire was administered to a sample of 20 respondents who were not part of the actual survey in order test the reliability and internal consistency of the questionnaire items. Cronbach's alpha was employed as the statistical measure to determine the internal consistency of the indicators. The finalized questionnaire was then used in the actual survey to gather data from the respondents, forming the basis for analysis and interpretation of the study's findings.

The reliability analysis revealed that all constructs demonstrated excellent internal consistency. The impact of bridge simulator training indicators achieved a reliability coefficient of .938, reflecting a high degree of item coherence. The learning efficiency indicators obtained a coefficient of .948, further indicating strong internal consistency. Meanwhile, the practical competence indicators recorded the highest coefficient at .952, confirming the exceptional reliability of the instrument used in evaluating the respondents' assessments.

Weighted mean was used to describe the respondents' a) impact of bridge simulator training, b) level of learning efficiency, and c) level of practical competence. Pearson's r Moment Correlation Coefficient was used to determine the relationship between the impact of bridge simulator training, level of learning efficiency, and level of practical competence of the respondent.

Results and Discussion

1. Impact of Bridge Simulator Training on the respondents

Table 1
Impact of Bridge Simulator Training on the respondents

Indicators	Weighted Mean	Verbal Interpretation	Rank
1.The bridge simulator provides realistic conditions that closely resemble actual maritime environments.	3.38	Very Positive	5
2.Using a bridge simulator effectively enhances my navigation training.	3.35	Very Positive	8
3. Bridge simulator exercises are relevant to the challenges faced in actual maritime operations.	3.38	Very Positive	5
4. Bridge simulator sessions improve my decision- making skills.	3.38	Very Positive	5
5. Bridge simulator exercises increase my confidence in actual navigation.	3.35	Very Positive	8
6. The simulator helps me practice bridge team management effectively.	3.35	Very Positive	8
7. Simulator scenarios are relevant to real-world maritime operations.	3.41	Very Positive	3
8.The bridge simulator enhances my situational awareness.	3.35	Very Positive	10
9. The simulator training improves my confidence in operating bridge equipment.	3.51	Very Positive	1
10.The bridge simulator is an effective tool for developing maritime competence	3.49	Very Positive	2
Overall Weighted Mean	3.39	Very Positive	

The data in Table 1 showed that the respondents view bridge simulator training positively, reflected in a weighted mean of 3.39 - labeled Very Positive. Thus, the tool appears key in boosting seafaring skills among trainees. The top response, "The simulator training improves my confidence in operating bridge equipment" (WM = 3.51, Rank 1), reveals hands-on experience increases self- assurance during equipment use - important for vessel control. Following this, second- and third- ranked items suggest users strongly agree it helps build professional abilities (WM = 3.49) while mimicking actual onboard situations well (WM = 3.41). Together, these points indicate the system effectively mirrors true maritime settings, allowing practice of classroom learning in a stable but lifelike context. Middle-range scores appeared for navigation drills, group coordination, self-assurance in steering tasks, also perception of surroundings - still seen as quite favorable (WMs = 3.35–3.38).

While the tool aids these skills well, adding tougher situations, joint activities, or structured guidance might boost results even more. In general, strong feedback across the board shows simulator use clearly builds practical abilities, judgment under pressure, preparedness for sea duties - highlighting its key place in seafaring instruction.

Kim et al,(2021), talked about the current and future of simulator-based training in Maritime Education and Training (MET), highlighting the impact of the COVID-19 pandemic and the accelerated adoption of digital technologies. Their study provides a comprehensive overview of existing simulator types used in MET, including desktop-based, full-mission, virtual reality (VR), and cloud-based simulators. They analyze the characteristics, advantages, and limitations of each simulator type, focusing on their fidelity, scalability, accessibility, and impact on learning. This study connects to our study by highlighting the evolving landscape of simulator-based training in MET and the increasing use of digital technologies.

Their focus on bridge operations aligns directly with our research, providing insights into the different types of bridge simulators available, their characteristics, and their potential impact on learning outcomes. We can leverage their findings to explore the specific impact of different bridge simulator types on learning efficiency and practical competence in our selected maritime students.

2. Respondent's Level of Learning Efficiency

Table 2
Respondents' Level of Learning Efficiency

Indicators	Weighted Mean	Verbal Interpretation	Rank
1. I find that using the bridge simulator makes it easier for me to learn navigation procedures.	3.35	Very High	8
2. I retain knowledge better when using the bridge simulator compared to traditional classroom methods.	3.30	Very High	10
3. The bridge simulator helps me put what I've learned in theory into real-world practice.	3.38	Very High	4.5
4. I can able to comprehend the repercussions of operational errors thanks to the simulator.	3.38	Very High	4.5
5. Doing exercises in the bridge simulator helps me improve how I make decisions during navigation	3.38	Very High	4.5
6. Using the bridge simulator makes it easier for me to catch on to new techniques and procedures	3.38	Very High	4.5
7. The amount I learned is well worth the time I invested in the training.	3.38	Very High	4.5
8. The training activities are focused and did not waste time on unnecessary information.	3.46	Very High	1
9. Strict compliance with International Maritime Regulations (SOLAS, COLREGs) is essential for minimizing human error and preventing collisions at sea.	3.32	Very High	9

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10. By the end of the session, all the stated training objectives were met.	3.38	Very High	4.5
Overall Weighted Mean	3.37	Very High	

The respondents' level of learning efficiency using the bridge simulator was very high, with an overall weighted mean of 3.37. Among the indicators, the highest-rated item, at 3.46, showed that the training activities were focused and did not waste
time on unnecessary information. This highlights the simulator's ability to provide efficient and targeted learning experiences.

Respondents also strongly agreed that the simulator helped them apply theoretical knowledge to practical scenarios, understand the consequences of operational errors, and improve decision-making during navigation, which all had a weighted mean of 3.38.

Additionally, learners reported that the simulator helped them acquire new techniques and procedures and that the time spent on training was worthwhile. Compliance with international maritime regulations, although slightly lower at 3.32, was seen as essential for reducing human error and ensuring safe navigation. The lowest- rated indicators, while still very high, concerned ease of learning navigation procedures (3.35) and knowledge retention (3.30), indicating some areas for further improvement.

Overall, the findings show that the bridge simulator is a highly effective tool for improving earning efficiency and promoting both theoretical understanding and practical skills in maritime operations. To sum up, an average weighted mean of 3.37 revealed that the respondents have a very high level of learning efficiency.As stated by Zghyer and Ostnes (n.d.), they talked about the use of ship-bridge simulators in maritime research, highlighting the need for innovative tools to address challenges in the ocean industry. They conducted a literature review of simulator use in maritime research, identifying three main categories: Simulator Facility, Experimental Practice, and Training and Evaluation.

They also interviewed researchers and professionals to understand the opportunities and challenges of using simulators in maritime research. This study connects to our study by exploring the potential of ship-bridge simulators not only for training but also for research and innovation. Their findings can inform your investigation of the impact of bridge simulation training on learning efficiency and practical competence in maritime students. We can utilize their identified opportunities and challenges to assess the potential and limitations of using simulators in your research and suggest strategies for maximizing their effectiveness.

3. Respondents' Level of Practical Competence

Table 3
Respondents' Level of Practical Competence

Indicators	Weighted Mean	Verbal Interpretation	Rank
1. I am confident in my ability to make effective navigational decisions, including route planning and collision avoidance.	3.43	Very High	5
2. I am capable of responding effectively to emergency situations, such as engine failure or man-overboard.	3.43	Very High	5
3. I can communicate and cooperate effectively with crew members during bridge operations.	3.49	Very High	2.5
4. I am proficient in using bridge equipment, such as ECDIS and radar, during navigation.	3.35	Very High	9.5
5. I consistently respect and follow the International Maritime Regulations (SOLAS, COLREGs) during simulator training.	3.54	Very High	1
6. I am able to use Standard Marine Communication Phrases (SMCP) effectively during operations.	3.38	Very High	8
7. I am able to maintain situational awareness and assess risks effectively while navigating, especially under changing conditions.	3.49	Very High	2.5

8. I am capable of taking a leadership role or working collaboratively with a team during bridge operations.	3.43	Very High	5
9. I can monitor and adjust the vessel's speed according to different conditions, like weather, currents, and traffic, ensuring safe navigation.	3.35	Very High	2.5
10. I'm confident in my ability to perform basic ship-handling maneuvers, like anchoring, berthing, and un-berthing, especially in a simulator environment where I can practice these skills.	3.41	Very High	7
Overall Weighted Mean	3.43	Very High	

The respondents demonstrated high practical skill in bridge operation, scoring weighted average of 3.34. While the top result was 3.54, reflecting consistent adherence
to global rules like SOLAS and COLREGs - pointing to serious attention toward safety and regulation compliance. While the top result was 3.54, it reflected consistent adherence to global rules like SOLAS and COLREGs - pointing to serious attention toward safety and regulation compliance. Even simulator-based maneuver practice and correct usage of standard marine phrases earned strong marks, though just below at 3.41 and 3.38 accordingly. Despite ranking lowest, skill in operating bridge tools like ECDIS and radar (3.35) remained quite solid - this points to a generally high hands-on capability.

Results indicate that simulator practice helps learners transfer classroom concepts to actual ship handling, so they can perform reliably when at sea.

Nazir et al. (2019), talked about simulator-based training has witnessed considerable attention in recent years for the training of operators in the maritime domain and is employed by majority of nautical training institutes. IMO has published the model course 6.10 Train the simulator trainer and assessor which acts as a guideline and aims to promote uniformity in the simulator based training for maritime operations.

Nevertheless, the model course should not be “implemented blindly,” since one has to acknowledge the institution’s own resources and apply them in an appropriate way. Consequently, a variation in different institutions' simulator training can exist.

4. Relationship Between the Impact of Bridge Simulator Training and their Level of Learning Efficiency

Table 4
Relationship Between the Impact of Bridge Simulator Training and their Level of Learning Efficiency

Variables	Statistical Treatment (Pearson’s)	p-value	Decision	Interpretation
Impact of training and learning efficiency	r=.869 (strong correlation)	.000*	H0 rejected	Significant

Table 4 shows a strong, significant positive correlation (r = .869, p < .001) between bridge simulator training impact and learning efficiency. The null hypothesis was rejected, supporting that the training program effectively enhances learning outcomes. This means that the more positive the impact of bridge simulator training the higher the level of learning efficiency of the respondents

According to Vincenzo et al. (2023) the current industrial environment relies heavily on maritime transportation. Despite the continuous technological advances for the development of innovative safety software and hardware systems, there is a consistent gap in the scientific literature regarding the objective evaluation of the performance of maritime operators. The human factor is profoundly affected by changes in human performance or psychological state.

5. Relationship Between the Respondent's Impact Bridge Simulator Training and their Level of Practical Competence

Table 5
Relationship Between the Impact of Bridge Simulator Training and their Level of Practical Competence

Variables	Statistical Treatment	p-value	Decision	Interpretation
Impact of training	r=.816	.000*	H0 rejected	Significant
Significant @.01				

Table 5 shows a strong, significant positive correlation (r = .816, p < .001) between bridge simulator training impact and practical competence. The null hypothesis was rejected, supporting that the training program effectively enhances practical competence. This means that the more positive the impact of bridge simulator training, the higher the level of practical competence of the respondents.

Gao et al. (2020) stated that training teaching based on virtual simulation technology is a hot development direction in the field of vocational education. In order to give full play to the advantages of virtual simulation technology in the training teaching of higher vocational colleges, starting from the practical application of road and bridge professional construction technology training teaching, and with the cooperation of construction enterprises, a practical and practical training The teaching mode was constructed and developed. A virtual simulation training and A teaching system for road and bridge engineering construction was presented.

6. Relationship Between the Respondents' Level of Learning Efficiency and their Level of Practical Competence

Table 6
Relationship Between the Respondents' Level of Learning Efficiency and their Level of Practical Competence

Variables	Statistical Treatment	p-value	Decision	Interpretation
Learning efficien-	r=.901	.000*	H0 rejected	Significant
Significant @.01				

Table 6 demonstrates a strong and statistically significant positive relationship (r =.901, p < .001) between how efficiently individuals learn and their practical skills. The data rejects the assumption of no relationship, indicating that better learning efficiency corresponds to higher practical competence. This means the higher the level of learning efficiency, the higher the level of practical competence of the respondents.

Abid et al. (2024), talked about the factors contributing to effective maritime simulator training. They conducted a systematic literature review to identify key factors that influence the success of simulator training program These factors include the quality of training materials, the competency of trainers, the use of realistic scenarios, the frequency of training sessions, the use of feedback mechanisms, the integration of new technologies, and the inclusion of human factors in the training curriculum. This study connects to our study by highlighting the importance of various factors that contribute to the effectiveness of maritime simulator training. It provides a valuable framework for assessing the quality and effectiveness of the bridge simulation training program in our study. We can utilize the identified factors to analyze the impact of bridge simulation training on learning efficiency and practical competence in maritime students. For example, we can investigate the relationship between the quality of training materials and student performance, or the impact of using realistic scenarios on the development of practical skills.

Conclusion

Based on the findings, the following conclusions were drawn: Training with a bridge simulator tends to have a very positive effect on respondents. This is evident from the improvement in their navigational skills, confidence, situational awareness, and decision-making abilities. Respondents demonstrate a very high level of learning efficiency. This indicates that the simulator helps them understand lessons better, apply theoretical knowledge in realistic conditions, and improve their overall performance. Respondents possess a very high level of practical competence, as reflected in their ability to navigate, communicate with the bridge team, maintain situational awareness, and comply with maritime regulations. Bridge simulator training makes a significant contribution to the learning efficiency of respondents. Positive experiences with simulators correlate with better understanding and the development of better skills. Bridge simulator training has a strong relationship to practical competence. Simulation-based activities help prepare students for actual maritime operations. There is a strong correlation between the learning efficiency and practical competence of the respondents. Students who engage in effective simulation learning also perform well in practical navigation and ship-handling tasks.

Direction for Future Use

Based on foregoing findings and conclusions, the following are offered as recommendations for possible actions: For maritime institutions academic officials provide advanced weather, traffic densities, and emergency scenarios to increase the realism of simulators as a way to further develop students' decision-making skills. They should also increase the frequency of bridge simulation training sessions in order to enhance knowledge retention and practical application. Include structured debriefing sessions after simulations to enhance reflective learning and thereby improve students' performance. Invest in modern bridge equipment, especially ECDIS and radar systems, to address the areas where students demonstrated lower proficiency. For maritime instructors, they should include longer, more complex scenarios that are multi-step to engage students and challenge critical thinking and adaptability. Employer performance-based assessments in simulation with the intention of offering a valid competency evaluation. They should also provide focused coaching on lesser competence areas, including equipment handling and vessel speed management. Students should be active participant in BRIDGE SIMULATION TRAINING sessions, taking advantage of repeated practice opportunities to enhance skill mastery. Regularly study principles of navigation and maritime regulations in order to enhance confidence and competence when conducting simulations. Seek feedback from instructors and apply it consistently to improve learning outcomes. Future researchers should study the long-term effects of bridge simulator training on shipboard performance. They could elaborate on how simulation performance is impacted due to psychological factors like stress or cognitive overload. Compare the outcomes of bridge simulator training with VR-based or AI- assisted training to identify the best combinations of training within contemporary MET programs. Investigate institutional barriers, such as cost and accessibility, that may affect the implementation of bridge simulator training. Simulation-based activities help prepare students for actual maritime operations. There is a strong correlation between the learning efficiency and practical competence of the respondents. Students who engage in effective simulation learning also perform well in practical navigation and ship-handling tasks.

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