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Competencies of Maritime Students in Professional Courses: A Study at a Philippine University in the Context of Joint CHED-MARINA Memorandum Circular

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About Article

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ABSTRACT

This study assessed the competence levels of maritime students in professional courses prescribed by the Joint CHED-MARINA Memorandum Circular No.1, Series 2023 (JCMMC), at the University of Cebu, Lapu-Lapu and Mandaue Campus, A.Y. 2023–2024. It examined the participants' profiles age, gender, and year level and their competencies in Terrestrial and Coastal Navigation (NAV 2), Celestial Navigation (NAV 4), Cargo Handling and Stowage (Seamanship 4), and Ship Construction (Seamanship 2). A descriptive-correlational design was employed, involving 200 Bachelor of Science in Marine Transportation students equally distributed across first- and second-year levels. Data were gathered using a validated departmental assessment questionnaire. Findings revealed that students were predominantly male and mostly aged 20. Competency levels varied across courses: students were generally very competent in NAV 2 and Ship Construction, moderately competent in Seamanship 4, and less competent in NAV 4. Significant but weak relationships were found between age and competence in NAV 2 and Seamanship 4, and between gender and the same courses. Year level showed a stronger correlation with competence across all subjects. The study highlights the need for adaptive instructional strategies and continuous assessment aligned with JCMMC standards. It recommends targeted interventions in Celestial Navigation and emphasizes the importance of demographic factors in shaping competency development. These insights contribute to enhancing maritime education and institutional compliance with JCMMC, guided by Tyler's Objective-Oriented Evaluation Model and Gagné's Nine Events of Instruction.

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1. INTRODUCTION

The maritime industry continues to evolve through technological innovation, prompting Maritime Higher Education Institutions (MHEIs) to adapt their curricula and training systems. In response to global standards and industry demands, the Joint CHED-MARINA Memorandum Circular No.1, Series 2023 (JCMMC) was issued to prescribe updated policies, standards, and guidelines for the Bachelor of Science in Marine Transportation (BSMT) and Marine Engineering (BSMarE) programs. These reforms align with the Philippine Qualifications Framework (PQF) Level 6 and the International Convention on Standards of Training, Certification, and Watchkeeping for Seafarers (STCW), 1978, as amended.

The JCMMC aims to ensure that Filipino maritime graduates remain globally competitive, particularly those serving as officers in charge of navigational or engineering watch in international shipping. Its implementation reflects the Philippines' commitment to addressing long-standing concerns in maritime education, including those raised by the European Maritime Safety Agency (EMSA), which previously warned of non-recognition of Philippine-issued certificates due to training deficiencies.

Despite these reforms, a critical gap remains in evaluating how well maritime students are developing competencies under the new JCMMC-aligned curriculum. Specifically, there is limited empirical evidence on how students' demographic profiles such as age, gender, and year level relate to their competence in professional maritime courses. This gap is particularly relevant for institutions like the University of Cebu Lapu-Lapu and Mandaue (UCLM), which are at the forefront of implementing JCMMC standards. To address this, the present study investigates the competency levels of maritime students in key professional courses and examines how demographic factors influence their performance. The findings aim to inform targeted instructional strategies and institutional action plans that enhance compliance with JCMMC and improve educational outcomes.

2. LITERATURE REVIEW

This study is anchored on McClelland's Competency Model (1973), supported by Tyler's Objective-Oriented Evaluation (1949) and Gagné's Instructional Design (1965). Together, these frameworks emphasize the development, assessment, and instructional alignment of competencies in professional education.

McClelland's model defines competencies as observable, measurable behaviors that lead to superior performance. It integrates both technical skills and personal attributes such as motivation and adaptability, forming the basis for competency-based recruitment and training. While widely applied in corporate settings (Cernusca & Dima, 2007; Shippman *et al.*, 2000), its integration into maritime education particularly in curriculum reforms like JCMMC remains limited. This gap underscores the need to examine how such models translate into student performance in regulated academic environments. Tyler's evaluation model complements this by stressing the alignment between educational objectives and actual student outcomes. It provides a lens for assessing whether curricular changes such as those introduced by JCMMC result in

measurable behavioral improvements (Stufflebeam & Shinkfield, 1985). Gagné's instructional design adds depth by advocating for structured learning events that foster critical thinking and skill transfer. However, debates persist between infusion-based and skills-based approaches, with critics arguing that isolated thinking skills may not transfer effectively across contexts.

Empirical studies reveal systemic challenges in Philippine maritime education. EMSA audits exposed gaps in STCW compliance, prompting CHED and MARINA to implement JCMMC reforms (Garcia, 2021; David, 2022). Despite these efforts, only 20% of maritime graduates reportedly serve onboard international vessels, raising concerns about training quality and competency outcomes.

Recent research highlights partial competency among BSMT students (Destacamento & Tupas, 2024), the need for authentic assessment (Galicia, 2022), and the importance of industry-aligned training (Guntoro & Simanjuntak, 2025). Studies also emphasize the role of 21st-century skills (Sarinas, 2019), digital literacy (Sijabat & Simanjuntak, 2024), and sustainability integration (Garay-Rondero & Issa-Zadeh, 2025). However, few have examined how student demographics age, gender, and year level interact with competency development under JCMMC-aligned curricula.

This study addresses that gap by evaluating maritime students' competencies in key professional courses and analyzing how demographic factors influence performance. By doing so, it contributes to instructional refinement, policy compliance, and the broader goal of producing globally competitive Filipino seafarers.

3. METHODOLOGY

This study employed a descriptive-quantitative research design to assess the competence levels of maritime students in professional courses prescribed by the Joint CHED-MARINA Memorandum Circular No. 1, Series 2023 (JCMMC). The descriptive approach enabled the researcher to interpret and analyze students' competency levels, while the quantitative method allowed for statistical examination of patterns and relationships across demographic variables.

3.1. Research locale

The study was conducted at the University of Cebu Lapu-Lapu and Mandaue (UCLM), specifically within the College of Maritime Education. UCLM is recognized for its advanced maritime training facilities, including Engine Room Simulators, Electronic Chart Display and Information Systems, Liquid Cargo Handling Simulators, and Full Mission Simulators. The institution is ISO 9001:2015 certified and accredited by the Liberian Maritime Authority, ensuring compliance with international maritime education standards.

3.2. Participants and sampling

The target population consisted of 753 first- and second-year Bachelor of Science in Marine Transportation (BSMT) students. A stratified random sampling technique was used to ensure proportional representation across year levels, resulting in a sample size of 200 participants. This method allowed for balanced demographic distribution and minimized sampling bias.



3.3. Research instrument

The study utilized a structured questionnaire developed by the Marine Transportation Department. The instrument was composed of two parts: (1) demographic profile (age, gender, year level), and (2) competency assessment in four professional courses NAV 2, NAV 4, Seamanship 2, and Seamanship 4. The questionnaire was not repurposed from routine departmental assessments; it was administered specifically for this research. However, it was based on the department's validated assessment framework, which undergoes regular reliability testing, item analysis, and alignment with the table of specifications. Competency scores were interpreted using the following scale:

- 76–100: Very Competent
- 51–75: Moderately Competent
- 26–50: Less Competent
- 0–25: Not Competent

3.4. Ethical considerations

Prior to data collection, formal approval was secured from the university administration. Participants were briefed on the study's objectives and scope, and informed consent was obtained. The study adhered to ethical principles of voluntary participation, confidentiality, and beneficence. Data were anonymized, and participants were assured of their right to withdraw at any time without consequence. The instrument was administered solely for research purposes, not as part of routine academic evaluation.

3.5. Data collection and analysis

Data were collected through face-to-face administration of the questionnaire, allowing the researcher to clarify instructions and ensure accurate responses. Completed questionnaires were collated, tallied, and tabulated for analysis. Statistical tools included frequency counts and percentages for demographic profiling, and Chi-square and Pearson's Coefficient C to determine the significance and strength of relationships between demographic variables and competency levels.

Quantitative results were interpreted descriptively to contextualize statistical findings within the broader goals of JCMMC compliance and instructional improvement. This approach provided actionable insights into areas of strength and needed intervention in maritime professional education.

4. RESULTS AND DISCUSSION

This segment of the study presents, analyzes, and interprets the data gathered by the researcher about the University of Cebu Maritime Education students' level of competence in professional courses as prescribed by the Joint CHED-MARINA Memorandum Circular No. 1 Series 2023. The data collected from the test questionnaire given to the respondents were consolidated, examined, analyzed, and interpreted scientifically and systematically to answer the research problems.

This segment is divided into three components: the profile of the respondents, level of competencies of the students in professional courses, and the correlation between the profile of the students and the level of competence in the identified professional courses.

Table 1. Profile of the participants

Variables	Frequency (n=200)	Percent (%)
Age (in years)		
19	32	16.00
20	97	48.50
21	45	22.50
22	15	7.50
23-25	11	5.50
Gender		
Male	192	96.00
Female	8	4.00
Year Level		
1st year	100	50.00
2nd year	100	50.00

As shown in Table 1, the profile of the participants was categorized by age, gender, and year level, with a total sample size of 200. In terms of age, subjects aged 20 forms the largest group, totaling 97 individuals, representing 48.50% of the sample. This group was followed by participants aged 21 years, with 45 individuals or 22.50% of the sample. Those aged 19 constitute 16.00% (32 participants), while 7.50% (15 participants) are aged 22 years. The smallest age group includes those between 23 and 25 years, comprising 11 individuals or 5.50% of the subjects. Regarding gender, most participants were male, with 192 individuals representing 96.00% of the sample, whereas females account for only 4.00%, totaling eight individuals. For year level, the participants were evenly split, with 1st-year and 2nd-year students making up 50.00% of the sample, each totaling 100 individuals per group. The data implied that the participants' demographics reveal a younger age, predominantly male, with balanced representation across the first two years of the study.

4.1. Level of competence of the participants in professional courses

This section presented the findings of the participants' level of competence in professional courses in terms of Terrestrial and Coastal Navigation (NAV 2), Celestial Navigation (NAV 4), Cargo Handling and Stowage (Seamanship 4), and Ship Construction (Seamanship 2). Tables 3 to 6 present summaries.

Table 2. Participants' level of competence in terrestrial and coastal navigation 2 (NAV2)

Score Ranges	Frequency (n=200)	Percent (%)	Description
76 -100	100	50.00	Very Competent
51 -75	55	27.50	Moderately Competent
26 -50	45	22.50	Less Competent
0 -25	0	0.00	Not Competent



As indicated in Table 2, the participants' level of competence in Terrestrial and Coastal Navigation (NAV 2) varies across different score ranges. The score ranged of 76-100 had the highest frequency, with 100 participants, or 50.00% of the sample, described as very competent. This finding indicates that half of the participants demonstrate high competence in NAV 2. Following this, 27.50% of the participants, totaling 55 individuals, fall within the score range of 51-75, described as moderately competent. This group represented those who had a moderate grasp of the subject matter. In the 26-50 score range, 45 participants, or 22.50% of the sample, are labeled as less competent, showed a limited level of proficiency in NAV 2. No participants scored within the 0-25 range, corresponding to the not competent category, reflecting that none of the students exhibited a complete lack of competence in NAV 2. This distribution highlights that most participants were competent in terrestrial and coastal navigation, with only a minority needing improvement. This result attributed to the appropriate implementation of the latest detailed teaching syllabus for Navigation 2, which enabled the majority of the students to have sufficient competencies.

The findings were supported by Johnson *et al.* (2023), who said that assessment in education is the collation of various data from different resources to student's learning and understanding. It identified individual students' flaws and strengths to enable educators to offer dedicated learning activities. Shabbir *et al.* (2021) stated that assessment plays a vital role; a teacher measures the student's performance and ability to determine how much a student is getting the idea. Through classroom evaluation, a teacher can improve student learning and classroom instructions. As a result, teachers could achieve educational goals to improve the performance of students. Additionally, Kunnath (2020) cited that from the evaluation, the lecturer could know whether students are making progress or not, reflect on the teaching methods, and make necessary changes in teaching strategies.

Table 3. Participants' level of competence in celestial navigation (NAV4)

Score Ranges	Frequency (n=200)	Percent (%)	Description
76 -100	0	0.00	Very Competent
51 -75	83	41.50	Moderately Competent
26 -50	115	57.50	Less Competent
0 - 25	2	1.00	Not Competent

As indicated in Table 3, the participants' level of competence in Celestial Navigation (NAV 4) was distributed across various score ranges. The score ranged with the highest frequency is 26-50, with 115 participants, or 57.50% of the sample, classified as less competent. This finding indicated that most students need to demonstrate higher competence in NAV 4. Following this, 41.50% of the participants, totaling 83 individuals, fall within the 51-75 score range, labeled moderately competent. This group showed a moderate understanding of celestial navigation concepts. Only two students, or 1.00% of the sample,

scored within the 0-25 range, categorized as not competent, suggesting a very minimal number of individuals with very low proficiency in NAV4. Notably, there were no participants in the 76-100 score range, meaning that none of the samples reached the very competent level in celestial navigation. This data suggested that most participants needed substantial improvement to achieve higher competence levels in NAV 4. The findings suggested that there were some issues and concerns regarding the implementation of the latest detailed teaching syllabus for Navigation 4, which resulted in insufficient competency among the students.

The findings were supported by the study of Islam and Tasnim (2021), which found that improvement of students' learning requires regular daily study hours as a factor that could affect academic performance. The same result was also cited by Dhokare *et al.* (2021) in their research on the evaluation of the academic performance of students using fuzzy logic. This work was based on the premise that the entire education system has undergone numerous changes to stand unhindered during the COVID-19 pandemic. Thus, all over the world, the educational system had changed its teaching and learning methods while evaluating the students' overall performance, becoming a complex task with the changing patterns. The traditional approach of evaluation may not be the best fit anymore since multiple factors are required to make an all-inclusive, multifaceted decision to keep up with the upgrades in evaluation schemes and patterns. Also, universities and educational institutes should emphasize the importance of skill-based learning, and major changes should be made in the curriculum for a cognitive approach to evaluate the students' performance.

In a competency-based approach, education should not focus on the transfer of knowledge, which constantly outdated, but on mastering the core competencies that could allow the students to acquire knowledge on their own. Competence was considered in terms of knowledge and skills acquired during the training and forming the content side of this training. It could also be noted that means properties, personality traits, determining its ability to perform activities on the basis of the acquired knowledge and the development skills and abilities (Kulik *et al.*, 2020).

Table 4. Participants' level of competence in cargo handling and stowage (Seamanship 4)

Score Ranges	Frequency (n=200)	Percent (%)	Description
76 -100	43	21.50	Very Competent
51 -75	82	41.00	Moderately Competent
26 -50	73	36.50	Less Competent
0 - 25	2	1.00	Not Competent

As indicated in Table 4, the participants' level of competence in Cargo Handling and Stowage (Seamanship 4) varies across the score ranges. The score ranged with the highest frequency is 51-75, with 82 students, or 41.00% of the sample, classified as moderately competent. The findings suggested that a significant



portion of the students possess a moderate competence level in this area. The subsequent highest frequency was in the 26-50 score range, where 73 participants, representing 36.50% of the sample, were labeled as less competent. These findings indicated that many participants needed more cargo handling and to wage competence. In the 76-100 range, 43 students, or 21.50% of the sample, were classified as very competent, reflecting a smaller group with a high level of expertise in this area. Lastly, only two students, or 1.00%, scored in the 0-25 range, falling under the not competent category, which shown that very few individuals lack basic competence in cargo handling and stowage. This distribution showed that most participants have moderate to limited competence, with a smaller percentage demonstrating high competence in this field. The results of this survey highlighted the importance of continuous training and education in cargo handling and stowage practices. While a majority of participants were moderately to highly competent, a substantial number still required additional training and development. The findings indicated that the latest detailed teaching syllabus for Seamanship 4 has been implemented according to its standard criteria, thus enabling the students to acquire adequate competencies.

The findings were supported by Social Cognitive Theory (SCT), developed by Bandura (2014). The theory could be applied to explain the distribution of competence levels in Table 4. This theory emphasized that individuals learn by observing others, imitating their behaviors, and experiencing the consequences of their actions. In the context of cargo handling and stowage, this theory could be interpreted as in observational learning where seafarers learn techniques and best practices by observing experienced crew members, instructors, and supervisors.

Self-efficacy is an individual's belief in their ability to perform a task successfully influences their motivation and performance. Those with high self-efficacy in cargo handling and stowage are more likely to perceive themselves as competent. Self-Regulation refers to individual's set goals, monitor their progress, and adjust their strategies to achieve desired outcomes. Self-regulation played a crucial role in maintaining and improving competence levels (Bandura, 2014).

By understanding the principles of SCT, maritime organizations could implement strategies to enhance the competence of seafarers in cargo handling and stowage. This may involved providing opportunities for observational learning, offering comprehensive training programs, and fostering a supportive work environment that promotes self-efficacy and continuous improvement (Bandura, 2014).

In addition, the Theory of Needs of McClelland (1973) could be relevant to understanding individual motivation and performance. The theory primarily focused on three types of motivational needs: need for Achievement (n-Ach), related to individuals who are driven to excel and achieve goals; need for Power (n-Pow) related to individuals who are motivated by the desire to influence and control others; need for Affiliation (n-Aff) refers to individuals who are motivated by the desire for strong relationships and belonging. These needs could influence an individual's motivation to learn and develop skills in cargo handling and stowage.

Table 5. Participants' level of competence in ship construction (Seamanship 2)

Score Ranges	Frequency (n=200)	Percent (%)	Description
76 -100	84	42.00	Very Competent
51 -75	79	39.50	Moderately Competent
26 -50	37	18.50	Less Competent
0 - 25	0	0.00	Not Competent

As indicated in Table 5, the participants' level of competence in Ship Construction (Seamanship 2) was distributed across several score ranges. The highest frequency was observed in the 76-100 score range, with 84 students, or 42.00% of the sample, classified as very competent. This finding indicated that a significant portion of students have a high level of competence in ship construction. Following this, 39.50% of participants, totaling 79 individuals, fall within the 51-75 score range, labeled moderately competent. This group represented those with a moderate understanding of the subject. The 26-50 score range included 37 participants, 18.50% of the sample, considered less competent. The findings suggested that fewer students showed more competence in this area. No participants scored within the 0-25 range; meaning no individuals were in the category of not competent for ship construction. This distribution highlights that most participants demonstrated high or moderate in ship construction, with only a tiny fraction requiring improvement. The findings revealed that the latest detailed teaching syllabus for Seamanship 2 was correctly implemented in accordance with its intended learning outcomes. As a result, the students were able to gain the required competencies.

The findings were supported by Newlyn (2013) when he said that providing learners with descriptions of the criteria and standards but creating opportunities to engage with these by, for example, applying the criteria and standards to a range of exemplars is important. Through engagement and discussion, learners could construct and understand the assessment requirements, which positions learners to engage in self-appraisal and generate internal feedback.

As stated by Driscoll (2000), learners constantly try to develop their own individual mental models of the real world from their perceptions of that world. As they perceive each new experience, learners continually update their own mental models to reflect the new information and will, therefore, construct their own interpretation of reality. Learners construct new knowledge on the foundations of their existing knowledge. However, radical constructivism states that the knowledge individuals create tells us nothing about reality and only helps us to function in our environment. Thus, knowledge is invented, not discovered. Students must gain a proper comprehension of the evaluation criteria and normative. Educating students on the standards and criteria is beneficial.

While specific studies on the competency levels of ship construction and seamanship workers may be limited, general research on workforce skills and industry trends can provide valuable insights. One of them is the International Maritime



Organization (IMO), the global regulatory body for shipping, has published various guidelines and standards related to maritime education, training, and certification. These standards can influence the level of competence expected of seafarers.

In essence, the data in Table 6 suggested that the participants, particularly those in the very competent category, may be driven by a strong need for achievement. This finding aligned with the competency model of McClelland (1973) and can help explain the high level of competence observed in this group. It is important to note that while n-Ach can be likely a significant motivator for many of the participants, other factors, such as personal interest, career aspirations, and cultural influences, may also play a role in their level of competence. By

understanding the underlying motivations of individuals in this field, organizations can develop strategies to enhance their performance and satisfaction further. For example, providing challenging assignments, offering opportunities for professional development, and recognizing and rewarding achievements can nurture and sustain a high level of motivation and competence.

4.2. Relationship of the participants' profile and their level of competence in professional courses

This section presented the results of the statistical treatment conducted on the significance of the relationships of the participants' profiles and their level of competence in professional courses. Table 6 summarized the results.

Table 6. Relationship of the participants' profile and their level of competence in professional courses

Variables	df	Computed Value	Critical Value	Decision on Ho	Interpretation
Age in relation to the competence in:					
Nav 2	8	17.708	15.507	Reject Ho	Significant C=0.29; slight)
Nav 4	8	12.699	15.507	Failed to Reject Ho	Not Significant
Seamanship 4	12	33.182	21.026	Reject Ho	Significant (C=0.38; slight)
Seamanship 2	8	13.852	15.507	Failed to Reject Ho	Not Significant
Gender in relation to the competence in:					
Nav 2	2	8.333	5.991	Reject Ho	Significant(C=0.20; negligible)
Nav 4	2	1.549	5.991	Failed to Reject Ho	Not Significant
Seamanship 4	3	9.665	7.815	Reject Ho	Significant (C=0.21; slight)
Seamanship 2	2	4.146	5.991	Failed to Reject Ho	Not Significant
Year level in relation to the competence in:					
Nav 2	2	64.695	5.991	Reject Ho	Significant (C=0.49; moderate)
Nav 4	2	31.551	5.991	Reject Ho	Significant (C=0.37; slight)
Seamanship 4	3	114.737	7.815	Reject Ho	Significant (C=0.60; moderate)
Seamanship 2	2	33.457	5.99	Reject Ho	Significant (C=0.38; slight)

As shown in Table 6, profile age had a significant relation to the participants' competencies in Navigation 2 and Seamanship 4, respectively. This result implied that as the students are still young, their capacity and interest to learn new things in order to achieve their goals are still very high.

The Competency Model of McClelland (1973) posits that individuals are primarily motivated by three fundamental needs: A need for Achievement, A desire to excel, achieve goals, and strive for success. Younger individuals might be more driven by achievement and power, seeking to establish themselves and climb the career ladder.

According to the competency model of McClelland (1973), the basis for this need lies in the affective gratification associated with mastering difficult tasks and/or improving one's performance relative to some standard of excellence. The need for achievement (often denoted as n achievement) is an implicit (unconscious) motive acquired via hedonic reinforcement of behavior-consequence associations. It is theorized to interact with individuals' explicit (conscious) achievement motives (often denoted as san Achievement) to shape their achievement

behavior, and recent evidence suggests that the degree of alignment between the two motivational systems is important to emotional well-being.

Furthermore, the Competency Model of McClelland (1973) posited that there have been stereotypes about gender and motivation. While the stereotypes are becoming less relevant, historical trends might still influence how gender impacts motivation. For example, women might be more inclined towards affiliation, while men might be more driven by achievement and power. However, it is important to note that these are generalizations, and individual differences can vary significantly.

Moreover, Table 7 revealed that the profile year level has a significant relation to the competencies of all the professional subjects being tested. This result could be considered as an indicator that as the students move up in their studies, their maturity to obtain their academic goals could also increase. Thus, most of them will strive to pass their academic examinations. Irvin *et al.* (2007) noted academic motivation and engagement as two related constructs are of high importance



for students' increased achievement, advancement, and academic success concerning the value of student academic motivation in instructional- learning environments.

While the tables did not directly assess the Competency Model of McClelland (1973), it provided insights into how demographic factors might influence individual motivations, which could be related to these underlying needs. By understanding these potential relationships, educators and employers can tailor their strategies to motivate and engage individuals better. However, it is crucial to recognize the limitations of this approach and consider the broader context of individual differences and cultural factors.

5. CONCLUSION

The study underscored the importance of considering students' demographic characteristics, such as age, gender, and year level, in evaluating their competence across various professional courses. Based on the results, it was concluded that the subjects exhibit differing competency levels in critical subjects like Navigation and Ship Construction, with some areas requiring

more focused attention and improvement. These findings emphasized the need for adaptive instructional strategies and continuous assessment, in line with Tyler's Objective-Oriented Evaluation Model and Gagné's Nine Events of Instruction, to effectively address the diverse needs of students and enhance their overall learning outcomes.

RECOMMENDATIONS

Based on the findings and conclusion of the study, the researcher recommends that the UCLM Maritime Education administrators should implement the proposed action plan to enhance the determined weak areas of the students' competence in the identified professional courses and for the future researchers to conduct further study on: Enhancing Instructional Strategies for Celestial Navigation in Maritime Education, the Impact of Demographic Factors on Cargo Handling Competence, and the Effectiveness of Practical Training and Simulations in Maritime Courses.

FUTURE DIRECTIONS

Table 7. Proposed action plan

Action Item	Objective	Target Group	Timeline	Responsible Person	Resources Needed	Evaluation Method
Review and Revise Course Content for Celestial Navigation	Improve competence in Celestial Navigation	Maritime Students (NAV4)	3 months	Course Instructors	Course syllabi, textbooks, online resources	Pre-and post-assessment tests
Implement Practical Cargo Handling Workshops	Address weaknesses in Cargo Handling	Maritime Students (Seamanship 4)	4 months	Training Coordinator	Cargo handling equipment, workshop facilitators	Observation, skill assessment
Introduce Peer Tutoring for Weak Areas	Provide additional support for low-scoring students	All Students with low performance in NAV 4 and Seamanship 4	6 months	Academic Support Team	Peer tutors, teaching materials	Monitoring academic improvement
Utilize Simulation Software for Navigation and Cargo Handling	Enhance practical learning experience	All students in relevant courses	6 months	IT Department, Course Instructors	Simulation software, computers	Performance-based simulation tests
Provide Continuous Feedback and Remediation	Address continuous improvement in weak areas	All Students with low performance in NAV 4 and Seamanship 4	Ongoing	Course Instructors	Feedback tools, grading rubrics	Regular feedback sessions, grade reviews

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