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Evaluation of Onboard Training Scheme of Maritime School: Basis for Enhancement of Training Program

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Abstract

This study aims to evaluate the onboard training program scheme of Maritime Higher Education Institutions (MHEIs) in the Zamboanga Peninsula. Specifically, the study determined the profile and onboard training scheme of the respondents, assessed their level of competency development and career readiness, and examined the significant differences and relationships between respondents' profile variables, onboard training program schemes, competency development, and career readiness. The study revealed that the majority of respondents were aged 18–24 years old and were currently enrolled in maritime schools. Both onboard training program scheme models were equally represented among the respondents. Results further showed that respondents demonstrated a high level of competency development in terms of hands-on experience, teamwork and leadership, critical thinking and decision-making, technical knowledge and skills, safety and emergency skills, and supervision and mentorship. Likewise, the respondents exhibited a high level of career readiness in terms of job preparedness, confidence in performing shipboard tasks, adaptability to shipboard environment and culture, communication skills, professional growth and maturity, and learning environment and support onboard. Base on the findings the study concluded that the 3-1 program scheme and 2-1-1 program scheme onboard training program of study were effective in enhancing the competency development and career readiness of maritime students. Furthermore, onboard training plays a vital role in equipping cadets with practical knowledge, technical competence, and professional attitudes necessary for maritime careers. It is recommended a continuous enhancement of onboard training programs, stronger collaboration between MHEIs and shipping companies, and regular evaluation of onboard training schemes to ensure alignment with industry standards and global maritime demands.

Keywords: Onboard Training Scheme, Maritime Higher Education Institutions, Career Readiness, Descriptive-Correlational Design, Zamboanga Penisula

1. Introduction

Background of the Study

The Maritime Higher Education Institution (MHEIs) in the Philippines offering BSMT and BSMar.E courses played vital roles in the maritime sector. All Maritime Higher Education Institution (MHEIs) in the Philippines is under the Commission on Higher Education (CHED) and Maritime Industry Authority (MARINA). Under CHED Memorandum Order no. 67 series of 2017, section 17 issued by the Commission on Higher Education (CHED) stated that Maritime Higher Education Institution (MHEIs) may adopt or develop their own program of study the 3-1 program scheme and 2-1-1 program scheme provided that all prescribed courses or competencies under the STCW table of competence are offered and complied with and the pre-requisites and co-requisites of the courses. (CMO No.67 series of 2017, section 17).

A Joint CHED-MARINA memorandum Circular No. 01 Series of 2022 issued by Commission on Higher Education (CHED) and Maritime Industry Authority (MARINA), a Revised Policies, Standard and Guidelines for the BSMT and BSMar.E Programs, under Annex H, JCMMC No. 01, Series of 2022 Revised Guidelines on the Approved Onboard Training Program

for BSMT and BSMar.E Students, Annex C1 Program of Study (3-1 program scheme) for BSMT and BSMar.E, Annex C2 Program of Study (2-1-1 program scheme) for BSMT and BSMar.E. (JCMMC No. 01 series of 2022, Annex C1 and C2).

The 3-1 program scheme and 2-1-1 program scheme in maritime apprenticeship programs are educational and onboard training program of study designed to develop skills in seafaring and maritime-related professions. There are two (2) Maritime Higher Education Institution (MHEIs) in Zamboanga Peninsula adopt the 3-1 program scheme and one (1) adopt the 2-1-1 program scheme. In this program of study cadets are trained on-the-job learning process, where apprentices learn through direct mentorship from experienced officer onboard ships. A study by Yusuke Mori (2025) [31] emphasized the acquisition of the requisite skills and knowledge to be a competent seafarer is highly dependent on the quality of education and training received in shore-based maritime education and training institutions (METS). As maritime operations became more complex with advancements in technology, formalized training program were introduced, blending practical and theoretical learning. The 3-1 program scheme cadets spend three (3) years in academic studies and one (1) year onboard apprentice initially adopted in many maritime institutions that produced officers with strong theoretical knowledge before they are exposed to extended sea service. It is common in many MHEIs to emphasize rigorous pre-sea training for deck and engineering officers. it is focus in the foundation subject navigation, engineering, ship operations, and maritime law, and its continuous sea year allows for practical application under the supervision of licensed officers. The 2-1-1 program scheme cadets spend two (2) years in academic studies, one (1) year onboard apprentice, and one (1) final academic year. With this they developed as an alternative to ensure students return to consolidate their sea experience with advanced theoretical training. The MHEIs emphasized a balance between education and sea exposure. It will focus first two (2) years cover basic maritime education and simulator training. One (1) year sea phase apprentice allows cadets to experience onboard training and the final year will advance topics and preparation for licensure examination. (International Maritime Organization, 2017 [17]; Commission on Higher Education, 2021).

This study therefore aims to evaluate the onboard training practices of Maritime Higher Education Institutions (MHEIs) in Zamboanga Peninsula focusing on the implementation and effectiveness of program of study 3-1 program scheme and 2-1-1 program schemes in developing competent maritime professionals in compliance with standards set by the Commission on Higher Education (CHED), Maritime Industry Authority (MARINA), and the Standards of Training, Certification and Watchkeeping.

Theoretical Framework

The main theory used by the study was that developed by David A. Kolb Experiential Learning Theory (ELT) provides a holistic model of the learning process and a multilinear model of adult development, both of which are consistent with what we know about how people learn, grow, and develop. The theory is called "Experiential Learning" to emphasize the central role that experience plays in the learning process, an emphasis that distinguishes Experiential Learning Theory (ELT) from other learning theories. Therefore, the term "experiential" is used to differentiate ELT from cognitive learning theories, which tend to emphasize cognition over affect, and behavioral learning theories which deny any role for subjective experience in the learning process. Another reason the theory is called "experiential" is its intellectual origins in the experiential works of Dewey, Lewin, and Piaget. Taken together, Dewey's philosophical pragmatism, Lewin's social psychology, and Piaget's cognitive developmental genetic epistemology form a unique perspective on learning and development. (Kolb, 1984) [9]. The program of study 3-1 program scheme and 2-1-1 program scheme integrate classroom-based theoretical learning with onboard practical experiences aligning with Kolb's cycle. Trainees progress by applying theoretical knowledge in real-world maritime operations. The 3-1 program scheme and 2-1-1 program scheme program of study are designed to produce competent seafarers who meet industry standards. The structured approach to skill acquisition in apprentice phase models.

Second, situated learning theory explains the process and development of learning when individuals can participate in a community of practice. In such a community, new learners reach the level of the expert as they have more opportunities to practice within the context of learning. In this light, learning is unintentional; this unintentional nature of learning is what the authors call Legitimate Peripheral Participation (LPP). In LPP, the learner moves from the periphery of the community to the center as he/she gains expertise and engages and participates actively in the sociocultural practices of the community (Lave & Wenger, 1991) [18]. Onboard training during apprentice phase models places seafarers within a community of maritime professionals, enabling them to learn in an authentic environment that mirrors real operational challenges.

These two theories emphasize that learning is most effective when students gain knowledge through real-world experience and active participation in actual working environments.

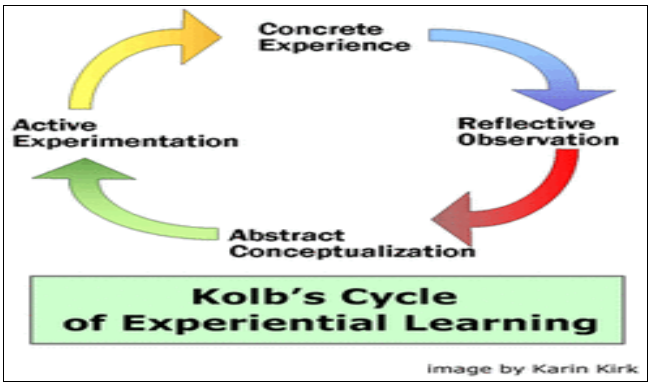

Fig 1: Kolb's Cycle Experiential Learning

Conceptual Framework

This framework includes the independent variable, dependent variable, and moderator variable of the study illustrating the differences of each other.

In Figure 2, it shows the conceptual framework for the evaluation of onboard training scheme and effectiveness of program of study 3-1 program scheme and 2-1-1 program scheme of Maritime Higher Education Institutions (MHEIs) in Zamboanga Peninsula.

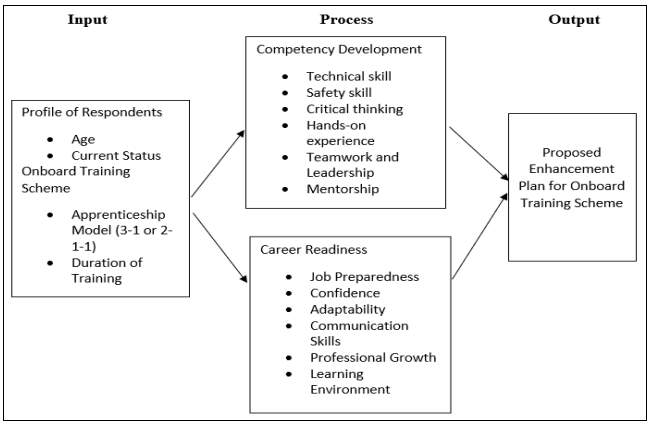

Fig 2: Conceptual Model

Figure 2 depicts the conceptual model, which is constructed using an Input-Process-Output framework, and depicts how the elements in all three categories of variables (inputs, process, and outputs) are interrelated to one another in a systematic and dynamic manner throughout the entire research study or system considered.

Input variables are the base or source of the raw materials for a research study and serve as the independent variables establishing the context, resources, and conditions under which the research study will take place; they are interrelated with each other because their collective nature and quality mark the limits of what can be produced and will be Actioning on to determine the amount of input available to provide for the final Output of the research study.

Process variables are the mechanisms or mediating links through which the activities, methods, procedures, and analyses that have been established based on the characteristics of the input variables will be implemented to transform the input variables into the output variables; the process variables are codified in a sequence such that each step must be based upon the previous step, the process variables will dictate the effectiveness or lack of effectiveness regarding how the input variables will be used, analyzed, or converted and establish the link between the materials available for production and the production of the output variables.

Output variables represent what has ultimately been produced as a result of the research study or system, or the dependent variables, which are determined solely by the effect that both the Input and Process have had upon them; the output will vary, depending upon the combination of the Input and Process components applied to produce it, and will be reflective of the adequacy and appropriateness of the input and process stages of the research study.

In total, the relationships identified between each category of variable comprehensively flow between the input variables through to the process variables to the output variables as a linear relationship; however, they are also functionally reciprocal in nature due to the fact that the input, process, and output variables associated within and between these three categories are closely interrelated. In other words, the respective characteristics of the input variables define how the process variables will be implemented, and therefore ultimately how the output variables will be produced. Additionally, the characteristics of the output variables are also reflective of the quality of the input and process variables; thus, in order to produce the intended results or outcomes, it is critically important to have each of these elements properly aligned and coordinated as part of the integrated system.

Statement of the Problem

The study aimed to evaluate the readiness of program of study 3-1 and 2-1-1 phase apprentice models in preparing seafarers for professional maritime careers.

Specifically, the study sought answers to the following questions:

1. What is the level of competency development of the respondents in terms of:
   1.1 Hands-on experience and real-world exposure;
   1.2 Teamwork and leadership;
   1.3 Critical thinking and decision-making;
   1.4 Technical knowledge and skills;
   1.5 Safety and emergency skills; and
   1.6 Supervision and Mentorship?
2. What is the level of career readiness of the respondents in terms of:
   2.1 Job preparedness;
   2.2 Confidence in performing shipboard tasks;
   2.3 Adaptability to shipboard environment and culture;
   2.4 Communication skills;
   2.5 Professional growth and maturity; and
   2.6 Learning environment, facilities, and support onboard?
3. Is there a significant difference on the competency development of the respondents when they are grouped according to age, current status, Apprenticeship model, and duration of training?
4. Is there a significant difference on the career readiness of the respondents when they are grouped according to age, current status, Apprenticeship model, and duration of training?
5. Is there a significant relationship on the profile and onboard training scheme to the competency development and career readiness of the respondents?
6. Based on the findings, what enhancement plan can be proposed to improve the onboard training schemes of maritime schools?

Hypothesis

This study hypothesized that:

1. There is no significant difference on the competency development of the respondents when they are grouped according to age, current status, Apprenticeship model, and duration of training.
2. There is no significant difference on the career readiness of the respondents when they are grouped according to age, current status, Apprenticeship model, and duration of training.
3. There a significant relationship on the profile and onboard training scheme to the competency development and career readiness of the respondents.

Significance of the study

This study is significant as it evaluates the effectiveness of onboard training program of study 3-1 program schemes and 2-1-1 program scheme implemented by Maritime Higher Education Institutions (MHEIs), serving as a basis for the enhancement of maritime training programs. The findings of this research are expected to provide valuable insights to various stakeholders, particularly government agencies responsible for maritime education, training, and regulation.

Government Agencies
This study can help the government in formulating program evaluation related to maritime training and certification. The findings may help ensure that onboard training schemes align with national and international standards, particularly in enhancing the competence and readiness of future seafarers. And may provide relevant data that can guide initiatives aimed at strengthening the country's maritime workforce and maintaining its global competitiveness in the shipping industry.

Maritime Higher Education Institutions (MHEIs)
The study may help maritime schools in identifying strengths and gaps in their current onboard training program of study schemes, enabling them to implement targeted improvements. It will also assist instructors and training officers in enhancing instructional strategies and supervision during shipboard training.

Students
This study may help improved training experiences, better competency development, and increased career readiness. Finally, this research contributes to producing highly skilled, competent, and globally competitive future seafarers.

Future Researchers
This study provides a valuable foundation for future researchers who intend to explore maritime education and training, particularly in the area of onboard training schemes. By evaluating the effectiveness of current training programs, this research offers empirical data, validated instruments, and methodological approaches that can be utilized or refined in subsequent studies within the field of Maritime Education and Training.

Scope and Delimitation of the study
The study was conducted in three (3) Maritime Higher Education Institutions (MHEIs), MHEI A, MHEI B, and MHEI C. The study therefore delimited itself to determining the effectiveness of the program of study 3-1 program scheme and 2-1-1 program scheme apprentice model within Zamboanga Peninsula.
The study was concentrated on the readiness of cadets to face the practical training onboard during apprenticeship and the effectiveness of the program of study 3-1 scheme and 2-1-1 scheme apprentice model that being practiced by the Maritime Higher Education Institutions (MHEIs)in Zamboanga Peninsula.

Definition of Terms
The following terminologies were defined as how the researcher intended to use them in the study.
2-1-1 Program scheme Model: This refers to a maritime apprenticeship structure where trainees complete two years of academic learning, one year of onboard practical training, and an additional year of academic instruction.
3-1 Program scheme Model: This pertains to a maritime apprenticeship structure where cadets complete three years of academic learning followed by one year of onboard practical training.
Adaptability to Shipboard Environment and Culture: This refers to the ability of a person to learn to adjust and cope with and/or function in an environment/tools or culture as experienced in maritime work at sea, including, but not limited to: being in a confined space, long hours of work, different cultures and work routines, and social dynamics. Respondent self-evaluation for how well they will adapt will be seen in how well respondents rate themselves on the continuum of their ability to adapt to the maritime work/culture environment.
Apprenticeship Program: This refers to a structured training program that combines theoretical education with practical, hands-on experience to prepare cadets for specific professions, such as seafaring.
Communication Skills: These refer to the ability to effectively communicate with others verbally/written/delivering messages in accordance with maritime communication standards under related ethnicities and other means of delivery between crewmembers, shipboard leadership, and other shoreline representatives. Respondents will rate themselves in terms of shipboard effective communication skills.
Competence: This pertains to the combination of knowledge, skills, attitudes, and abilities that enable an individual to perform tasks effectively and efficiently in each profession or field. It is not just about possessing theoretical knowledge but also about applying it in real-world situations with confidence and accuracy.
Confidence in the Performing of Shipboard Tasks: This refers to the individual belief and knowing that by the respondents having confidence in their ability to do the job or at performing the job tasks they will do so safely, correctly, and do it well repeatedly can be measured by the way that the respondents rate themselves on the continuum of confidence when performing shipboard tasks.
Critical Thinking and Decision-making: This category represents how respondents perceive their ability to analyze situations, interpret information, evaluate options and select appropriate actions quickly and logically in a timely manner, especially when under pressure and/or uncertainty.
Hands-on Experience and Real-world Exposure: This represents how respondents assess their level of practical hands-on experience, application and real-world exposure to maritime duty onboard vessels. This study will indicate the amount of practical experience and hands-on exposure respondents have had, according to their own assessment.
Job Readiness: This refers to the overall description of being fully ready to perform work tasks as required by reason/such as, knowledge/skill requirements per job/position (knowledge, abilities, documents, and/or qualifications) as determined by the rating of how ready respondents evaluate themselves to begin performing the duties of the Job Transition Survey's intended position.
Learning Environment, Facilities and Support Onboard: These refer to the availability/quality/adequacy of resources/resources/technical tools and equipment are all used to evaluate how the learning tools of the respondents/equipment/train and/or train as part of their work provide an opportunity for respondents to succeed and provide for the Professional Growth of the respondents while at sea via the Maritime Career Readiness Survey.
Level of Competency Development: This refers to the degree to which the respondents have acquired and demonstrated their developed knowledge, skills and/or abilities as described by them using a scale (1-4, 1-5, etc.) representing their self-assessed level of proficiency in the four categories of shipboard operations; hands-on experience; teamwork and leadership; critical thinking and

decision-making; technical knowledge and skills; between areas such as customer service, emergency procedures, communications, etc., during or through working at sea or with people whom they work.

Maritime Career Readiness: This refers to the extent to which a person is ready, able, and qualified to enter, or perform successfully, in the maritime field and is measured by way of multiple indications via a rating scale based on how the respondent rates themselves.

Maritime Industry Standards: These refer to the guidelines and requirements established by the maritime sector, including the International Maritime Organization (IMO) and Standards of Training, Certification, and Watchkeeping (STCW), to ensure safety, efficiency, and professionalism.

Onboard Training: This refers to the structured and supervised practical learning experience conducted on a vessel, where cadets and seafarers apply their theoretical knowledge in real-world maritime operations.

Professional Growth and Maturity: These refer to the professional attitudes; professional work ethics; responsibility; professionalism; self-discipline; stability/emotional; and how you act like a responsible adult in the work environment are used to determine how the respondents perceive themselves to have developed to be able to have an effective professional maritime career by responding to the Maritime Career Readiness Survey.

Safety and emergency skills: These refer to the knowledge of the safety regulations pertaining to their job (i.e. hazard identification, risk mitigation, etc., and the ability to perform emergency actions such as: fight a fire, abandon ship, provide first aid and/or damage control), which reflects how the participants feel about their competency with regard to performing at a satisfactory level by maintaining the safety standards required, and responding effectively to emergencies onboard.

Seafarers' Readiness: This refers to the level of preparedness of maritime trainees to effectively perform their roles and responsibilities in real-world shipboard operations, including competence, confidence, and adaptability.

Stakeholders: These refer to the individuals or organizations with an interest in maritime apprenticeship programs, including trainees, instructors, shipping companies, regulatory bodies, and training institutions.

Supervision and mentorship: These refer to the ability to supervise and mentored others by assisting them with their work and/or learning as well as how to receive direction from supervisors and guidance from experienced team members is represented by the degree to which the respondents rate their ability to oversee work tasks and direct others to do their jobs or mentor/respond to questions regarding their jobs.

Teamwork and Leadership: These refer to the respondents' level of skill and knowledge related to collaborating and communicating in a group and/or team work environment, taking initiative and supporting other team members while working.

Technical Knowledge and Skills: These refer to how respondents understand theoretical concepts, laws, regulations, rules and procedures, and how to utilize and/or operate equipment, tools, machinery.

Theoretical Knowledge: This refers to a foundational principles, concepts, and information acquired through formal education and training, which serve as the basis for understanding of a specific field or profession.

2. Review of Related Literature and Studies

This chapter presents the review of related literature and studies that support the present research study on evaluation of onboard training scheme of Maritime Higher Education Institutions (MHEIs) in Zamboanga Peninsula.

Recent study emphasizes according to the seafarer workforce report (BIMCO & ICS, 2021) [5] the shortage of seafarers particularly at the officer rank is projected to reach 25,000 by 2026. This significant shortfall in the international shipping workforce may worsen if young cadets are unable to access essential onboard training opportunities. Additionally, an apparent lack of sufficient level of quality training further compromises seafarer competence, ultimately affecting the long-term safety and productivity of the shipping industry. A study conducted by Yusuke Mori (2025) [31].

It also emphasized the key factors contributing to this shortage is the limited availability of onboard training opportunities for cadets. Shipboard training is a mandatory requirement under the Standards of Training, Certification and Watchkeeping (STCW), as it provides the practical experience necessary for cadets to qualify for certification as officers. However, due to the limited number of training berths offered by shipping companies, many cadets struggle to complete their required sea service. This bottleneck delays their progression into licensed officers, further widening the gap between supply and demand in the maritime workforce.

In addition to the shortage of training opportunities, concerns have also been raised regarding the quality of onboard training. Not all training experiences provide sufficient exposure to critical shipboard operations, and inconsistencies in supervision, mentoring, and assessment can affect the overall competence of cadets. When training is inadequate, cadets may complete their required sea time without fully developing the necessary technical skills, decision-making abilities, and safety awareness expected of professional seafarers.

In similar study, Darul Prayogo (2024) [8] Onboard training is expected to improve students' ability to recognize the environment, working atmosphere, management, organizational structure, workplace and environmental maintenance, work safety, and work attitude based on expertise. In addition, onboard training also provides opportunities for students to explore skills and provide real work experience. Cultivating a professional attitude, broadening the horizons of the world of work, to providing opportunities to promote themselves in the world of work. Experience is one of the factors that determine work participation. The experience students gain while attending onboard training is needed to improve mastery of knowledge and performance following their field of work obtained through education and training.

Onboard Training as Part of the Curriculum

Onboard training is widely recognized as an essential component of maritime education, serving as a bridge between theoretical knowledge and practical application. According to Mori and Manuel (2024) [32], onboard training is integrated into the curriculum of maritime institutions worldwide, with variations in implementation depending on

available resources such as simulators, training vessels, and institutional policies. Their study emphasized that training programs must be aligned with educational theories and competency-based learning to ensure that students acquire the necessary skills for professional practice.

Furthermore, Bacasdoon *et al*. (2024) [4] highlighted that onboard training plays a crucial role in developing practical competencies among maritime students. Through structured tasks such as completing the Training Record Book (TRB) and participating in real-life ship operations, students gain hands-on experience that cannot be achieved through classroom instruction alone. This reinforces the importance of incorporating onboard training as a core element of the curriculum.

To remain competitive in the international shipping industry, maritime institutions must ensure that cadets are equipped with the required technical competence, discipline, and adaptability demanded by merchant vessels. A study conducted by Ronald G. Magsino *et al*. (2023) [29] Students' Onboard Experiences: Basis for Improved Shipboard Training Program Policy. The study revealed that cadet-trainees were significantly exposed to technical tasks during their shipboard assignments, indicating that the training program effectively provides practical, hands-on experience aligned with industry standards. One of the strengths identified in the program is the development of high tolerance to work stress and challenging shipboard conditions, which are essential traits for seafarers.

Effectiveness of Pre-Onboard Training Programs

Pre-onboard training programs have been identified as an important preparatory phase before students embark on actual shipboard training. Del Rosario (2025) [10] found that students who underwent structured pre-onboard training were more capable of completing their Training Record Book accurately and efficiently. The study revealed that such programs help reduce common errors and delays that may hinder students' academic progress.

The findings suggest that integrating a well-designed pre-onboard training program into the curriculum enhances students' readiness and confidence. It also ensures that students are equipped with the foundational knowledge and skills necessary for onboard tasks, thereby improving the overall effectiveness of the training program.

Learning Environment and Conditions During Onboard Training

The quality of the onboard training experience is significantly influenced by the learning environment and working conditions on board. Lee *et al*. (2021) [21] emphasized that factors such as safety, health, and the overall working environment directly affect students' learning outcomes. A supportive and well-regulated environment enables students to perform their duties effectively and enhances their professional development.

In contrast, unfavorable conditions may hinder learning and negatively impact students' motivation and performance. Therefore, it is essential for maritime institutions and shipping companies to ensure that onboard training environments are conducive to learning and aligned with educational objectives.

Student Satisfaction and Program Evaluation

Evaluating the effectiveness of onboard training programs is crucial for continuous improvement. Kim and Kim (2013) [20] stressed the importance of aligning training programs with international standards, particularly the Standards of Training, Certification, and Watchkeeping (STCW). Their study indicated that student satisfaction is a key indicator of program effectiveness and should be regularly assessed to identify areas for improvement.

By incorporating feedback mechanisms and evaluation tools into the curriculum, institutions can ensure that onboard training programs remain relevant, effective, and responsive to the needs of students and the maritime industry.

Challenges Encountered in Onboard Training

Despite its importance, onboard training presents several challenges for students. Dimo (2025) [11] identified issues such as limited mentorship, stressful working conditions, and communication barriers as significant factors affecting students' ability to complete their training. These challenges may lead to decreased motivation and difficulties in fulfilling academic requirements.

Additionally, Phanphichit and Bartusevičienė (2024) [26] pointed out that inconsistencies in curriculum implementation, lack of qualified trainers, and financial constraints further complicate the effectiveness of onboard training programs. These findings highlight the need for improved support systems and standardized training procedures within the curriculum.

Importance of Onboard Training in Skill and Competency Development

Onboard training is essential in developing not only technical skills but also professional and interpersonal competencies. Phanphichit and Bartusevičienė (2024) [26] noted that students gain valuable experience in applying theoretical knowledge in real-world situations, as well as in adapting to diverse cultural and professional environments.

This experiential learning process enhances students' readiness for employment and prepares them for the demands of the maritime industry. As such, onboard training remains a vital component of maritime education and curriculum development.

3. Methodology

This chapter presents the research methodology used in the study. It included the research design, locale of the study, population sampling design, research instrument, data gathering procedure, and statistical tools.

Research Design

This study utilized a quantitative approach with a descriptive evaluative research design. It will evaluate the effectiveness of onboard training program of study scheme implemented by Maritime Higher Education Institutions (MHEIs). The design is appropriate because it focuses on describing the current practices of the program of study 3-1 program scheme and 2-1-1 program scheme apprenticeship program scheme and evaluating their impact on cadets' competencies, skill, and readiness for maritime careers.

The study also incorporated a quantitative approach, supported by limited qualitative data to gather measurable information and deeper insights for respondents. This combination allows the researcher to analyzed both numerical data and personal experience related to onboard training.

Research Locale

This study focused on three (3) selected Maritime Higher Education Institutions (MHEIs) situated within the Zamboanga Peninsula, a region recognized for its strategic coastal location and offering BSMT and BSMarE program. The identified institutions, herein referred to as MHEIs A, MHEIs B, and MHEIs C, were chosen based on their established maritime programs, compliance with national and international maritime education standards, and their implementation of onboard training program of study scheme for cadets. The study aims to identify the program of study scheme of this three (3) Maritime Higher Education Institutions (MHEIs), as well as to evaluate the effectiveness of onboard training program of study scheme. Through a comparative analysis of the program of study scheme implemented by this three (3) MHEIs, this research aimed for enhancement and highlighted best practices that may serve as models for others. The findings are expected to provide a localized yet comprehensive understanding that may serve as a basis for enhancing maritime training program of study scheme not only within the selected MHEIs but also in similar institutions across the region.

Population and Sampling Design

Table 1: Distribution of Respondent's Population

MHEIs	Frequency	Percentage
A	50	50%
B	30	30%
C	20	20%
Total	100	100%

Table 1 shows the respondents are students, alumni who completed the one (1) year onboard training program of study 3-1 program scheme and 2-1-1 program scheme in the three (3) MHEIs in Zamboanga Peninsula, the total student population numbered 100 (MHEIs A: 50, MHEIs B: 30, MHEIs C: 20). The sample size was determined thru purposive sampling as well as the total enumeration technique.

Table 2: Respondents' Profile

Variance	Frequency	Percentage
Age		
18-24	75	75.00
25-31	23	23.00
32-38	2	2.00
39 and above	0	0.00
Total	**100**	**100.00**
Current Status		
Enrolled in Maritime School	70	70.00
Graduate of Maritime School	21	21.00
Seafarer	8	8.00
Others, pls specified: ___	1	1.00
Total	**100**	**100.00**
Apprenticeship program of study scheme		
3-1 program of study scheme	50	50.00
2-1-1 program of study scheme	50	50.00
Total	**100**	**100.00**
Completed the apprenticeship program of study scheme		
Two (2) contract to complete the 1 year	8	8.00
1 year	81	81.00
More than 1 year but less than 3 years	7	7.00
3 years or 36 months	4	4.00
Total	**100**	**100.00**

The demographic and background information of 100 respondents is provided in Table 2. This information can give some insight into the general makeup of the sample and help to determine whether it is a good sample for the maritime education and apprenticeship research study. The greatest number of respondents (75%; n=75) were in the 18-24 age group, 23% (n=23) were in the 25-31 age group, and 2% (n=2) in the 32 to 38 year-old age group with no respondents 39 years old and up. This data pattern for the respondents is consistent with the usual demographic of people taking maritime training (young adults are generally the individuals entering through maritime training schools). Due to the fact that the vast number of respondents are in the beginning stages of starting their careers (through formal education or have just finished their education), they would possess the perspectives that sport the study's focus on maritime training and apprenticeship experience.

Of the respondents surveyed, 70% (n=70) are currently attending maritime school, 21% (n=21) previously attended and graduated from a maritime institution, and only 8% (n=8) currently work as seafarers with only 1% (n=1) of the respondents classified as other. This distribution supports that the sample contained primarily individuals who have or are shortly going to have direct recent experience with the maritime education and training systems. Students who enrolled in maritime programs share their experience about how these programs are structured and what their requirements are; graduates share their experience of completing these programs and transitioning into the workforce. While there are only a small percentage of currently working seafarers, these respondents provide a unique perspective that is relevant to this study due to being past graduates and having experienced the transition from training to employment. Therefore, with those in the other category being so limited, any other data generated from this category of sample will continue to be closely related to the maritime education and apprenticeship focal point of your study.

In relation to the structure of the program of study through an apprenticeship, there are equal numbers of respondents in each of the two programs; 50% of respondents (n=50) as part of the 3-to-1 program and 50% of respondents (n=50) as part of the 2-to-1-to-1 program. This equal number of respondents is a major advantage of your sample as it allows for an equal, direct comparison of the training structures of both programs. A typical 3-to-1 program consists of three years in a classroom setting and one year in an apprenticeship setting on a ship. In comparison, a 2-to-1-to-1 program consists of two years in a classroom, one year of practical training, and one additional year of advanced study or advanced coursework. An equal number of respondents from both training programs will help establish that any variances or similarities found among experiences, challenges and outcomes can be attributed to the design of the two different programs and not to an unequal number of

respondents, allowing for fair and accurate comparisons between the two programs.

In terms of completing the apprenticeship requirements, most respondents (81%, n=81) completed their training in the expected period of one year; eight respondents (8%, n=8) completed their training in two years through two separate contracts; seven respondents (7.0000%, n=7) required greater than one year but less than three years to finish their apprenticeship; and four respondents (4%, n=4) required as much as three years (36 months) to finish their apprenticeship. These results indicate that there is a large percentage of respondents who completed their apprenticeships in the expected timeframe. A large percentage of respondents who completed their apprenticeship through two contracts most likely faced limited shipboard placements; gaps in employment; or contract termination (common issues in the maritime industry due to fluctuations in ship availability and industry demands). The small number of respondents who took longer than one year to complete their apprenticeship faced challenges such as regulatory requirements, personal situations and limited industry opportunities. Thus, while all respondents successfully completed their apprenticeships within the expected timeframe, it is clear that there are gaps that create obstacles to others completing their apprenticeships.

A young population of maritime students (enrolled or recently graduated) primarily comprises respondents; respondents representing both major apprenticeship training programs are evenly distributed across both program types. Data collected will therefore be clearly applicable and relevant to the objectives of your study. The lessons learned from the findings will clearly demonstrate both the success of the current apprenticeship programs, as well as the practical impediments faced by maritime educational institutions and students through the implementation of the current programs. The lessons learned from the results will help educational institutions, training providers and industry stakeholders to improve their policies, support systems, and partnerships within the industry to ensure the smoothest, most consistent, and timely completion of maritime training programs.

Research Instrument

This study adopted a comprehensive and systematic approach to data collection to ensure that all relevant information needed to address the research objectives was obtained. Specifically, the data for this study were gathered through a researcher-made questionnaire designed to evaluate the onboard training schemes implemented by Maritime Higher Education Institutions (MHEIs) in the Zamboanga Peninsula.

The questionnaire was carefully constructed to capture key dimensions essential to the study. These dimensions were directly aligned with the primary purpose of the research, which is to assess the effectiveness of onboard training programs, particularly the 3-1 program scheme and the 2-1-1 program scheme.

To ensure ease of response and consistency in data collection, the questionnaire items were presented in a structured format where respondents were asked to indicate their answers by placing a check mark in the box corresponding to their chosen option. This format allowed for efficient data coding, tabulation, and analysis.

Moreover, a Likert scale was employed as a key measurement tool to assess the level of competency development and career readiness of the students. Through this scale, respondents were able to express the degree of their agreement or perceived level of preparedness across various indicators related to real-world maritime professions. This enabled the researcher to quantify subjective perceptions and translate them into measurable data, thereby providing a clearer evaluation of how effectively the onboard training programs contribute to students' professional growth and readiness for maritime careers.

Table 3: Likert Scale for level of competency development and career readiness Where:

No	Scale	Option	Description
5	4.20–5.00	Strongly Agree (SA)	Demonstrates outstanding competency and is fully prepared for career demands with minimal supervision.
4	3.40–4.19	Agree (A)	Shows strong competency and is well-prepared for career tasks with occasional guidance.
3	2.60–3.39	Neutral (N)	Displays adequate competency and is fairly prepared but still requires regular supervision.
2	1.80–2.59	Disagree (D)	Shows limited competency and needs significant improvement and close supervision.
1	1.00–1.79	Strongly Disagree (SD)	Demonstrates minimal competency and is not yet ready for career responsibilities.

Furthermore, a Likert scale was used to measure the level of effectiveness of onboard training program of study 3-1 program scheme and 2-1-1 program scheme in three (3) Maritime Higher Education Institutions (MHEIs) in Zamboanga Peninsula. The scale ranges from Strongly Agree to Strongly Disagree, allowing respondents to express their view on the onboard training program of study that implemented in MHEIs.

Validity of the Research Instrument

The research instrument used in this study was subjected to a thorough validation process to ensure its reliability, clarity, and relevance to the objectives of the research. The researcher- made questionnaire was developed and presented to a panel of experts composed of professionals in maritime education, research methodology, and onboard training practices. These experts evaluated the instrument in terms of content validity, structure, language clarity, and alignment with the study's variables, particularly on apprenticeship program of study scheme participation, competency development, and career readiness. After the revisions based on their comments and recommendations, the revised instrument appears appropriate and understandable to respondents. The revised instrument was then pilot-tested among a small group of respondents similar to the target population to assess its reliability and internal consistency. The results of the validation and pilot testing confirmed that the instrument was appropriate and effective for data collection.

Data Gathering Procedure

The process of data gathering for this study was carried out in a systematic and organized manner. The researcher

prepared a formal letter requesting permission to conduct the study, in a selected Maritime Higher Education Institutions (MHEIs) having a apprenticeship program of study 3-1 program scheme and 2-1-1 program scheme in Zamboanga Peninsula.

Upon approval, the researcher coordinated with the Dean of the College of Maritime Education to facilitate in the conduct of data gathering. A validated researcher-made questionnaire was utilized as the primary data gathering tool. Before administration, the purpose of the study and instructions for answering the questionnaire were clearly explained to the respondents to ensure proper understanding. The questionnaires were then distributed personally, and respondents were given adequate time to answer the questionnaires.

After the allotted period, the researcher collected the accomplished questionnaires and carefully checked them for completeness. Any incomplete or unclear responses were addressed accordingly. Throughout the process, ethical considerations were strictly observed. Participation was voluntary, and respondents were assured of the confidentiality of their responses, which were used solely for academic and research purposes. The collected data were then organized, and tabulated using Microsoft Excel in preparation for statistical analysis.

Ethical Considerations

This study strictly established ethical standards to ensure the protection, rights, and well-being of all participants. Prior to data collection, permission was obtained from the concerned Maritime Higher Education Institutions (MHEIs) having a apprenticeship program of study 3-1 program scheme and 2-1-1 program scheme. Participation in the study was entirely voluntary, and respondents were informed of their right to withdraw at any point without any penalty or consequences. Informed consent was secured from all participants before administering the questionnaire. They were provided with a clear explanation of the study's purpose, procedures, and the intended use of the data. Confidentiality was ensured by not requiring participants to disclose personal identifiers such as names or identification numbers.

All data gathered were treated with utmost confidentiality and were used solely for academic and research purposes. The responses were securely stored and were not shared with unauthorized individuals or entities. Furthermore, the researcher ensured that no harm, discomfort, or risk was imposed on the participants throughout the conduct of the study. The researcher also maintained honesty and integrity in reporting the findings, ensuring that the data were presented accurately without fabrication, falsification, or misrepresentation.

Statistical Tools

The data collected from the survey questionnaire were tabulated. The statistical treatment using a Statistical Package for Social Sciences (SPSS) was used in this study, with the following.

Weighted Mean: This was utilized to determine the average responses of the participants regarding the level of apprenticeship program of study scheme participation, as well as competency development and career readiness in terms of skills, knowledge, attitude, and safety.

Mann- Whitney U Test: This was utilized in this study to determine whether there is a significant difference in the respondents' apprenticeship program of study scheme participation and competency development and career readiness when grouped according to their profile variables. This non-parametric statistical test was used as an alternative to the independent samples t-test, particularly when the data do not meet the assumptions of normality.

Kruskal-Wallis Test: This was utilized in this study to determine whether there are significant differences in the respondents' apprenticeship program of study scheme participation and competency development and career readiness when grouped according to profile variables with three or more categories (e.g., year level, type of apprenticeship duration, or other multi-group classifications). This non-parametric statistical test serves as an alternative to the one-way Analysis of Variance (ANOVA) and is appropriate when the assumptions of normality and homogeneity of variance are not satisfied. It compares the median scores of three or more independent groups to identify if at least one group differs significantly from the others.

4. Results and Discussion

This chapter includes the presentation, analysis and interpretation of data gathered based on the questionnaire. Findings of the study were arranged based on the statement of the problem of this study. The data were statistically treated and presented in a tabular form.

Research problem 1: What is the level of competency development of the respondents in terms of hands-on experience and real-world exposure, Teamwork and leadership, critical thinking and decision-making, technical knowledge and skills, safety and emergency skills, and supervision and mentorship?

In Table 4 presents the level of competency development of the respondents in terms of hands-on experience and real-world exposure, teamwork and leadership, critical thinking and decision-making, technical knowledge and skills, safety and emergency skills, and supervision and mentorship.

For hands-on experience and real-world exposure, the respondents strongly agreed that they gained significant hands-on experience during their apprenticeship which was crucial for competency development, obtaining a mean of 4.420 interpreted as Very High. Although the indicators related to apprenticeship participation and duration reflected lower ratings due to their categorical nature, the overall mean of 4.515 with a verbal interpretation of Strongly Agree indicates that the apprenticeship scheme effectively provided practical exposure and experiential learning opportunities for maritime cadets.

Table 4: Level of competency development of the respondents in terms of

Competency Development	*Mean*	*Std. Dev*	*Descriptive Rating*	*Verbal Interpretation*
Hands-on experience and real-world exposure				
Apprenticeship scheme Participation	1.500	.503	Strongly Disagree	Very Low
How long did you complete the apprenticeship scheme?	2.070	.555	Disagree	Low
I gained significant hands-on experience during my apprenticeship, which was crucial for my competency	4.420	.5548	Strongly Agree	Very High
Overall Mean	**4.515**	**.429**	Strongly Agree	Very High
Teamwork and leadership				
I developed strong teamwork and leadership skills during my apprenticeship	4.490	.628	Strongly Agree	Very High
I enhanced my communication and teamwork skills during training.	4.460	.539	Strongly Agree	Very High
Overall Mean	**4.475**	**.484**	Strongly Agree	Very High
Critical thinking and decision-making				
The apprenticeship model allowed me to develop critical thinking and decision-making skills for maritime tasks.	4.505	.429	Strongly Agree	Very High
Overall Mean	**4.505**	**.429**	Strongly Agree	Very High

Scale: Strongly Agree (4.20-5.00); Agree (3.40-4.19); Neutral (2.60-3.39); Disagree (1.80-2.59); Strongly Disagree (1.00-1.79)

In terms of teamwork and leadership, respondents strongly agreed that the apprenticeship developed their teamwork, leadership, and communication skills. The indicators obtained means of 4.490 and 4.460, both verbally interpreted as Very High, with an overall mean of 4.475. This suggests that onboard training environments encourage collaboration, discipline, and interpersonal interaction among cadets and crew members.

Regarding critical thinking and decision-making, respondents strongly agreed that the apprenticeship model enabled them to develop analytical and decision-making skills necessary for maritime operations, obtaining an overall mean of 4.505 interpreted as Very High. This implies that cadets were exposed to actual shipboard situations that enhanced their ability to respond to operational challenges and make sound judgments.

Table 5: Level of competency development of the respondents in terms of

Technical knowledge and skills	*Mean*	*Std. Dev*	*Descriptive Rating*	*Verbal Interpretation*
The onboard training provided by my maritime school adequately developed my technical skills (e.g., navigation, safety procedures, machinery operation).	4.410	.683	Strongly Agree	Very High
I gained practical knowledge in navigation and watchkeeping.	4.330	.697	Strongly Agree	Very High
I improved my technical skills in engine or deck operations	4.390	.601	Strongly Agree	Very High
Overall Mean	**4.377**	**.518**	Strongly Agree	Very High
Safety and emergency skills				
The apprenticeship model helped me develop essential safety skills for working at sea.	4.630	.544	Strongly Agree	Very High
I developed confidence in handling shipboard emergencies	4.200	.667	Strongly Agree	Very High
I learned to comply with maritime safety and security regulations.	4.470	.540	Strongly Agree	Very High
Overall Mean	**4.433**	**.458**	Strongly Agree	Very High
Supervision and mentorship				
I received adequate supervision and mentorship from onboard instructors during my training.	4.350	.702	Strongly Agree	Very High
Overall Mean	**4.350**	**.702**	Strongly Agree	Very High

Scale: Strongly Agree (4.20-5.00); Agree (3.40-4.19); Neutral (2.60-3.39); Disagree (1.80-2.59); Strongly Disagree (1.00-1.79)

Table 5 shows that the technical knowledge and skills, respondents strongly agreed that onboard training adequately enhanced their technical competencies in navigation, watchkeeping, machinery operation, and deck or engine functions. The indicators obtained means ranging from 4.330 to 4.410, with an overall mean of 4.377, verbally interpreted as Very High. This indicates that the apprenticeship scheme successfully strengthened the practical and technical capabilities of maritime trainees.

In terms of safety and emergency skills, respondents strongly agreed that the apprenticeship model helped them develop essential safety competencies, confidence in handling emergencies, and compliance with maritime safety regulations. The indicators posted means ranging from 4.200 to 4.630, with an overall mean of 4.433, interpreted as Very High. The highest mean of 4.630 indicates that safety training remains one of the strongest components of maritime apprenticeship programs.

Lastly, for supervision and mentorship, respondents strongly agreed that they received adequate guidance and mentorship from onboard instructors during training, with a mean of 4.350, verbally interpreted as Very High. This suggests that supervision and mentoring contributed significantly to the learning and competency development of maritime cadets.

Overall, the findings reveal that the apprenticeship schemes provided by maritime schools contributed positively and effectively to the competency development of the respondents across various professional dimensions.

The very high ratings across all competency areas imply that apprenticeship schemes are highly effective in preparing maritime students for real-world maritime operations. The strong development of hands-on experience indicates that practical exposure remains essential in bridging the gap between theoretical learning and actual shipboard practice. The very high ratings in teamwork, leadership, and communication skills suggest that maritime training programs help cadets adapt to multicultural and collaborative shipboard environments. Maritime schools

may continue strengthening group-based training activities and leadership development programs to further enhance these competencies. The findings on critical thinking and decision-making imply that onboard apprenticeship provides cadets with opportunities to apply problem-solving skills in realistic operational situations. This supports the importance of experiential learning in producing competent and confident future seafarers. The high ratings in technical knowledge and skills indicate that maritime schools and shipping companies are effectively implementing competency-based maritime education and training aligned with industry standards. This may help improve cadets' employability, professional readiness, and compliance with international maritime requirements. The strong results in safety and emergency skills emphasize the effectiveness of safety-oriented maritime training programs. Since maritime work involves high-risk operations, schools and shipping companies should continue prioritizing safety drills, emergency preparedness, and compliance with international maritime safety regulations. Finally, the very high rating for supervision and mentorship implies that onboard instructors and training officers play a vital role in cadets' professional growth. Effective mentorship contributes not only to skill acquisition but also to confidence-building, discipline, and career preparedness. Maritime institutions may therefore strengthen mentoring systems and partnerships with shipping companies to sustain quality onboard training experiences.

Research Problem 2: What is the level of career readiness of the respondents in terms of Job preparedness; Confidence in performing shipboard tasks; Adaptability to shipboard environment and culture; Communication skills; Professional growth and maturity; and Learning environment, facilities, and support onboard?

Table 6: Level of Career Readiness of the respondents in terms of

Career Readiness	*Mean*	*Std. Dev*	*Descriptive Rating*	*Verbal Interpretation*
Job preparedness				
The apprenticeship adequately prepared me for employment in the maritime industry	4.340	.623	Strongly Agree	Very High
The apprenticeship program developed my necessary skills to performed a job as a seafarer.	4.490	.611	Strongly Agree	Very High
The onboard training prepared me for my future role as a seafarer	4.300	.674	Strongly Agree	Very High
Overall Mean	**4.240**	**.698**	Strongly Agree	Very High
Confidence in performing shipboard tasks				
After completing the apprenticeship, I felt confident in my ability to perform maritime duties.	4.500	.577	Strongly Agree	Very High
I feel more confident in performing tasks independently.	4.450	.609	Strongly Agree	Very High
Overall Mean	**4.270**	**.588**	Strongly Agree	Very High
Adaptability to shipboard environment and culture				
I believe the apprenticeship enhanced my ability to adjust to the challenges of working onboard a vessel	4.390	.567	Strongly Agree	Very High
The training onboard helped me understand the importance of maritime discipline.	4.280	.621	Strongly Agree	Very High
During my apprenticeship I was able to adapt to the working culture onboard.	4.450	.592	Strongly Agree	Very High
Overall Mean	**4.447**	**.477**	Strongly Agree	Very High

Scale: Strongly Agree (4.20-5.00); Agree (3.40-4.19); Neutral (2.60-3.39); Disagree (1.80-2.59); Strongly Disagree (1.00-1.79)

Table 6 presents the level of career readiness of the respondents in terms of job preparedness, confidence in performing shipboard tasks, adaptability to shipboard environment and culture, communication skills, professional growth and maturity and learning environment, facilities, and support onboard.

For job preparedness, the respondents strongly agreed that the apprenticeship adequately prepared them for employment in the maritime industry, developed the necessary skills to perform job as seafarers, and prepared them for their future roles onboard. The indicators obtained means ranging from 4.300 to 4.490, with an overall mean of 4.240, with a verbal interpretation of "Very High" indicates that the apprenticeship program effectively enhanced the respondents' readiness for maritime employment. This suggests that the training provided relevant practical exposure and competency development aligned with industry requirements.

For the confidence in performing shipboard tasks, respondents strongly agreed that they felt confident in performing maritime duties., and performing tasks independently. The indicators obtained means of 4.450 and 4.500, with an overall mean of 4.270 with a verbal interpretation as Very High. This demonstrates that the onboard training strengthened the cadets' self-confidence and operational competence in performing shipboard responsibilities.

In terms of adaptability to the shipboard environment and culture, the respondents strongly agreed that the apprenticeship improved their ability to adjust to onboard challenges, understand maritime discipline, and adapt to shipboard working culture. The indicators obtained means ranging from 4.390 to 4.450, with an overall mean of 4.447, with a verbal interpretation of "Very High," indicates that the apprenticeship successfully exposed the respondents to the realities of shipboard life and fostered adaptability, discipline, and professionalism essential in maritime operations.

Table 7: The level of competency development of the respondents in terms of

Communication skills	***Mean***	***Std. Dev***	***Descriptive Rating***	***Verbal Interpretation***
The apprenticeship improved my professional communication skills, both onboard and in industry settings.	4.420	.606	Strongly Agree	Very High
Overall Mean	**4.420**	**.606**	Strongly Agree	Very High
Professional growth and maturity				
The apprenticeship program developed my necessary skills to performed a job as a seafarer.	4.290	.537	Strongly Agree	Very High
My training onboard contributed to my professional growth and maturity.	4.090	.588	Strongly Agree	Very High
Overall Mean	**4.445**	**.527**	Strongly Agree	Very High
Learning environment, facilities, and support onboard				
The ship provided a conducive learning environment.	4.280	.668	Strongly Agree	Very High
The equipment and facilities onboard were sufficient for training	4.150	.626	Agree	High
I was treated fairly and professionally by the ship's crew during engine-watchkeeping duty.	4.130	.748	Agree	High
I had access to learning materials and references during training.	1.650	.809	Strongly Disagree	Very Low
I learned to performed Engine -Watch keeping throughout the duration of the training.	1.940	2.083	Disagree	Low
Overall Mean	**4.188**	**.439**	Agree	High

Scale: Strongly Agree (4.20-5.00); Agree (3.40-4.19); Neutral (2.60-3.39); Disagree (1.80-2.59); Strongly Disagree (1.00-1.79)

Table 7 reveals the area of communication skills, the respondents strongly agreed that the apprenticeship improved their professional communication skills both onboard and within industry settings. It obtained a mean score of 4.420 with a verbal interpretation of "Very High" signifies that the training enhanced effective communication, which is vital for teamwork, safety, and operational efficiency in maritime workplaces.

For professional growth and maturity, the respondents strongly agreed that the apprenticeship contributed to the development of their skills, professional growth, and maturity. The indicators obtained a mean score of 4.090 to 4.290, with overall mean of 4.445, verbally interpreted as "Very High," suggests that the onboard training positively influenced the respondents' professional attitudes, responsibility, and readiness to assume future maritime roles.

Lastly, for learning environment, facilities, and support onboard, the respondents generally agreed that the ship provided a conducive learning environment and sufficient equipment and facilities for training. They also agreed that they were treated fairly and professionally by the ship's crew. However, two indicators obtained significantly lower ratings: access to learning materials and references during training it obtained a mean score of 1.650, verbally interpreted as "Very Low" and learning to perform engine-watchkeeping throughout the duration of training which obtained a mean score of 1.940, verbally interpreted "Low". Despite these low ratings, it obtained the overall mean score of 4.188, was still verbally interpreted as "High." This indicates that while the respondents viewed the general onboard environment positively, there were deficiencies in instructional resources and practical engine-watchkeeping exposure that may have affected some aspects of learning and competency development.

A study by David Muirhead (2000) emphasized that apprenticeship and onboard training significantly improve cadets' job preparedness, confidence, adaptability, and professional competence through practical exposure and experiential learning. It implies that the apprenticeship program greatly contributed to the respondents' career readiness, particularly in developing job preparedness, confidence, adaptability, communication skills, and professional maturity. However, improvements in learning support resources and practical engine-watchkeeping training are necessary to further strengthen the effectiveness of the onboard training program.

Research Problem 3: Is there a significant difference on the competency development of the respondents when they are grouped according to age, current status, Apprenticeship model, and duration of training?

In Table 8, it presents the results of the significant difference in the competency development of respondents when grouped according to age using the Chi-square test.

For hands-on experience and real-world exposure, respondents aged 18–24 years old obtained a mean rank of 51.22, those aged 25–31 years old had 46.87, and respondents aged 32–38 years old had 65.25. The computed Chi-square value of 1.047 with a p-value of 0.592 is greater than the 0.05 level of significance. Therefore, the result is not significant, leading to the acceptance of the null hypothesis. This indicates that age does not significantly influence the respondents' level of hands-on experience and real-world exposure gained from the apprenticeship scheme.

Table 8: Results of a significant difference on the competency development of the respondents when they are grouped according to age

	Age	*N*	*Mean Rank*	*Chi-square*	*p-value*	*Remarks*	*Decision on Ho*
A. Hands-on experience and real-world exposure	18-24	75	51.22	1.047	.592	Not Significant	Accept Ho
	25-31	23	46.87				
	32-38	2	65.25				
	Total	100					
B. Teamwork and leadership;	18-24	75	46.83	5.332	.070	Not Significant	Accept Ho
	25-31	23	61.13				
	32-38	2	65.75				
	Total	100					
C. Critical thinking and decision-making	18-24	75	48.17	2.474	.290	Not Significant	Accept Ho
	25-31	23	58.35				
	32-38	2	47.50				
	Total	100					
D. Technical knowledge and skills	18-24	75	47.88	2.717	.257	Not Significant	Accept Ho
	25-31	23	57.67				
	32-38	2	66.25				
	Total	100					
E. Safety and emergency skills	18-24	75	48.70	2.365	.306	Not Significant	Accept Ho
	25-31	23	154.11				
	32-38	2	76.50				
	Total	100					
F. Supervision and mentorship	18-24	75	48.33	2.049	.359	Not Significant	Accept Ho
	25-31	23	57.22				
	32-38	2	54.75				
	Total	100					
a. Kruskal Wallis Test, b. Grouping Variable: Age							

In terms of teamwork and leadership, respondents aged 18–24 had a mean rank of 46.83, respondents aged 25–31 had 61.13, and respondents aged 32–38 had 65.75. The Chi-square value of 5.332 and p-value of 0.070 indicate a not significant result since the p-value is still higher than 0.05. Hence, the null hypothesis is accepted. This suggests that teamwork and leadership skills developed during an apprenticeship are comparable across different age groups.

For critical thinking and decision-making, respondents aged 18–24 obtained a mean rank of 48.17, those aged 25–31 had 58.35**,** and respondents aged 32–38 had 47.50. The computed Chi-square value of 2.474 with a p-value of 0.290 indicates no significant difference. Therefore, the null hypothesis is accepted, implying that the apprenticeship scheme equally enhances critical thinking and decision-making skills regardless of age.

Regarding technical knowledge and skills, the mean ranks were 47.88 for respondents aged 18–24, 57.67 for respondents aged 25–31, and 66.25 for respondents aged 32–38. The Chi-square value of 2.717 and p-value of 0.257 show that the result is not significant. Thus, the null hypothesis is accepted. This means that the acquisition of technical competencies is not significantly affected by the age of the respondents.

For safety and emergency skills, respondents aged 18–24 obtained a mean rank of 48.70, respondents aged 25–31 had 54.11, and respondents aged 32–38 had 76.50. The computed Chi-square value of 2.365 with a p-value of 0.306 indicates no significant difference. Therefore, the null hypothesis is accepted, suggesting that respondents across all age groups similarly developed safety and emergency competencies during apprenticeship training.

Lastly, in terms of supervision and mentorship, respondents aged 18–24 had a mean rank of 48.33, respondents aged 25–31 had 57.22, and respondents aged 32–38 had 54.75. The Chi-square value of 2.049 and p-value of 0.359 indicate a not significant result. Hence, the null hypothesis is accepted, meaning that the respondents' perceptions regarding supervision and mentorship do not significantly differ according to age.

Overall, the findings reveal that there is no significant difference in the competency development of respondents when grouped according to age across all dimensions measured. This indicates that the apprenticeship scheme provides relatively equal opportunities for competency enhancement regardless of the respondents' age bracket.

The absence of significant differences across age groups implies that maritime apprenticeship programs are effective in providing equitable competency development opportunities to all trainees regardless of age. This suggests that the apprenticeship schemes implemented by maritime schools and shipping companies are standardized and competency-based in nature. The findings indicate that younger and older cadets alike are capable of acquiring practical experience, technical knowledge, leadership skills, safety competencies, and critical thinking abilities through onboard training. This highlights the inclusivity and effectiveness of maritime training programs in addressing the learning needs of diverse age groups.

Since age does not significantly influence competency development, maritime institutions may focus more on improving training quality, instructional methods, mentorship systems, and practical exposure rather than emphasizing age-related differences among trainees. The results further imply that competency acquisition in maritime education depends more on the quality of training experiences and supervision than on demographic characteristics such as age. Moreover, the findings support the principle of equal learning opportunities in maritime education and reinforce the importance of maintaining standardized apprenticeship policies and competency assessment procedures for all cadets.

In Table 9, it presents the results of the significant difference in the competency development of the respondents when

grouped according to their current status using the Chi-square test. The findings revealed that all computed p-values were greater than the 0.05 level of significance, indicating that there is no significant difference in the respondents' competency development across the different groups based on current status. Thus, the null hypothesis was accepted in all indicators.

For Hands-on Experience and Real-World Exposure, the computed chi-square value was 1.773 with a p-value of .621, which is higher than 0.05. This indicates that the respondents, regardless of whether they are enrolled in maritime school, graduates, or others, have comparable perceptions regarding the development of hands-on experience and exposure gained from the apprenticeship program.

Table 9: Results of a significant difference on the competency development of the respondents when they are grouped according to Current Status

	Current Status	*N*	*Mean Rank*	*Chi-square*	*p-value*	*Remarks*	*Decision on Ho*
A. Hands-on experience and real-world exposure	Enrolled in Maritime School	70	51.02	1.773	.621	Not Significant	Accept Ho
	Graduate of Maritime School	21	48.36				
	Graduate of Maritime School	8	47.38				
	Others, pls specified	1	84.00				
	Total	100					
B. Teamwork and leadership;	Enrolled in Maritime School	70	52.98	3.990	.263	Not Significant	Accept Ho
	Graduate of Maritime School	21	42.07				
	Graduate of Maritime School	8	46.94				
	Others, pls specified	1	82.50				
	Total	100					
C. Critical thinking and decision-making	Enrolled in Maritime School	70	53.14	4.451	.217	Not Significant	Accept Ho
	Graduate of Maritime School	21	42.55				
	Graduate of Maritime School	8	44.00				
	Others, pls specified	1	84.50				
	Total	100					
D. Technical knowledge and skills	Enrolled in Maritime School	70	51.88	2.792	.425	Not Significant	Accept Ho
	Graduate of Maritime School	21	46.24				
	Graduate of Maritime School	8	44.81				
	Others, pls specified	1	89.00				
	Total	100					
E. Safety and emergency skills	Enrolled in Maritime School	70	51.01	2.149	.542	Not Significant	Accept Ho
	Graduate of Maritime School	21	48.55				
	Graduate of Maritime School	8	46.31				
	Others, pls specified	1	89.00				
	Total	100					
F. Supervision and mentorship	Enrolled in Maritime School	70	52.03	2.263	.520	Not Significant	Accept Ho
	Graduate of Maritime School	21	44.62				
	Graduate of Maritime School	8	49.31				
	Others, pls specified	1	76.50				
	Total	100					

Table 9 also reveals that Teamwork and Leadership has the computed chi-square value of 3.990 and p-value of .263 also showed no significant difference among the groups. This suggests that the apprenticeship program similarly enhanced teamwork and leadership skills among respondents regardless of their current status.

For Critical Thinking and Decision-Making, the chi-square value of 4.451 with a p-value of .217 revealed no significant difference. This implies that the respondents consistently perceived that the apprenticeship scheme contributed equally to the development of their analytical and decision-making abilities.

Regarding Technical Knowledge and Skills, the computed chi-square value was 2.792 with a p-value of .425, indicating no significant difference among the groups. This means that the apprenticeship program effectively developed technical competencies in a similar manner across respondents of different current statuses.

Similarly, for Safety and Emergency Skills, the chi-square value of 2.149 and p-value of .542 showed no significant difference. The result indicates that the respondents shared similar assessments of the apprenticeship program's contribution to safety awareness and emergency preparedness.

Lastly, in Supervision and Mentorship, the chi-square value of 2.263 with a p-value of .520 also indicated no significant difference. This suggests that respondents perceived comparable levels of guidance, supervision, and mentorship during their apprenticeship experiences regardless of their current status. Study explained that competency development among maritime cadets is primarily influenced by the quality of apprenticeship and practical exposure rather than the cadets' current academic or employment status Emad and Roth (2008). Overall, the findings imply that current status does not significantly influence the competency development of the respondents. The apprenticeship program appears to provide consistent competency enhancement across all groups of respondents.

In Table 10, it presents the results of the significant difference in the competency development of the respondents when grouped according to the year they completed the apprenticeship scheme using the Chi-square test. The findings revealed that some competency indicators showed significant differences while others did not. This indicates that the duration of apprenticeship completion

influenced certain aspects of competency development among the respondents.

For Hands-on Experience and Real-World Exposure, the computed chi-square value was 5.986 with a p-value of .112, which is greater than the 0.05 level of significance. This indicates that there is no significant difference in the respondents' perceptions of hands-on experience and real-world exposure regardless of the length of time they completed the apprenticeship scheme. Hence, the null hypothesis was accepted.

Table 10: Results of a significant difference on the competency development of the respondents when they are grouped according to years of completion

	How long did you complete the apprenticeship scheme?	*N*	*Mean Rank*	*Chi-square*	*p-value*	*Remarks*	*Decision on Ho*
A. Hands-on experience and real-world exposure	Two (2) contract to complete the 1 year	8	31.00	5.986	.112	Not Significant	Accept Ho
	1 year	81	50.96				
	More than 1 year but less than 3 years	7	59.07				
	3 years or 36 months	4	65.25				
	Total	100					
B. Teamwork and leadership	Two (2) contract to complete the 1 year	8	43.38	5.148	.161	Not Significant	Accept Ho
	1 year	81	48.86				
	More than 1 year but less than 3 years	7	68.93				
	3 years or 36 months	4	65.75				
	Total	100					
C. Critical thinking and decision-making	Two (2) contract to complete the 1 year	8	32.44	8.723	.033	Significant	Reject Ho
	1 year	81	50.41				
	More than 1 year but less than 3 years	7	73.93				
	3 years or 36 months	4	47.50				
	Total	100					
D. Technical knowledge and skills	Two (2) contract to complete the 1 year	8	44.00	8.934	.030	Significant	Reject Ho
	1 year	81	47.90				
	More than 1 year but less than 3 years	7	75.86				
	3 years or 36 months	4	71.88				
	Total	100					
E. Safety and emergency skills	Two (2) contract to complete the 1 year	8	46.31	2.407	.492	Not Significant	Accept Ho
	1 year	81	49.27				
	More than 1 year but less than 3 years	7	60.86				
	3 years or 36 months	4	65.63				
	Total	100					
F. Supervision and mentorship	Two (2) contract to complete the 1 year	8	43.88	2.610	.456	Not Significant	Accept Ho
	1 year	81	50.31				
	More than 1 year but less than 3 years	7	64.07				
	3 years or 36 months	4	43.88				
	Total	100					

In terms of Teamwork and Leadership, the computed chi-square value of 5.148 and p-value of .161 also revealed no significant difference among the groups. This suggests that teamwork and leadership competencies were similarly developed among respondents despite differences in apprenticeship completion duration. Therefore, the null hypothesis was accepted.

For Critical Thinking and Decision-Making, the computed chi-square value was 8.723 with a p-value of .033, which is lower than the 0.05 level of significance. This indicates a significant difference among the respondents' competency development in terms of critical thinking and decision-making based on the duration of apprenticeship completion. Respondents who completed the apprenticeship in more than one year but less than three years obtained the highest mean rank, implying that longer exposure may have contributed to stronger analytical and decision-making skills. Thus, the null hypothesis was rejected.

Similarly, for Technical Knowledge and Skills, the chi-square value of 8.934 and p-value of .030 showed a significant difference among the groups. This result suggests that the duration of apprenticeship completion significantly affected the respondents' acquisition of technical knowledge and skills. Respondents who completed the apprenticeship in more than one year but less than three years and those who completed it within three years obtained higher mean ranks, indicating greater perceived competency development. Therefore, the null hypothesis was rejected.

Regarding Safety and Emergency Skills, the computed chi-square value was 2.407 with a p-value of .492, which indicates no significant difference among the groups. This means that respondents developed similar safety and emergency competencies regardless of the duration of apprenticeship completion. Hence, the null hypothesis was accepted.

Lastly, for Supervision and Mentorship, the computed chi-square value of 2.610 and p-value of .456 also revealed no significant difference. This implies that the respondents experienced relatively similar levels of supervision and mentorship throughout their apprenticeship training regardless of the time taken to complete the program. Therefore, the null hypothesis was accepted. Study found that prolonged onboard exposure improves technical proficiency and practical decision-making but may not necessarily create significant differences in teamwork, leadership, or safety skills because these competencies are commonly standardized across maritime training programs. Sampson and Tang (2015). Overall, the findings indicate that the length of apprenticeship completion significantly influenced competency development in the areas of critical

thinking and decision-making as well as technical knowledge and skills, while no significant differences were found in hands-on experience, teamwork and leadership, safety and emergency skills, and supervision and mentorship.

In Table 11, it presents the results of the Mann–Whitney U Test on the significant difference in the competency development of the respondents when grouped according to apprenticeship scheme participation, specifically the 3-1 program scheme model and the 2-1-1 program scheme model. The findings revealed that all computed p-values were greater than the 0.05 level of significance, indicating that there is no significant difference in the competency development of respondents between the two apprenticeship schemes. Therefore, the null hypothesis was accepted in all indicators.

Table 11: Results of a significant difference on the competency development of the respondents when they are grouped according to Apprenticeship scheme

	Apprenticeship scheme Participation	*N*	*Mean Rank*	*Mann-Whitney U*	*p-value*	*Remarks*	*Decision on Ho*
A. Hands-on experience and real-world exposure	3-1 Model	50	47.46	1098.000	.265	Not Significant	Accept Ho
	2-1-1 Model	50	53.54				
	Total	100					
B. Teamwork and leadership	3-1 Model	50	49.78	1214.000	.794	Not Significant	Accept Ho
	2-1-1 Model	50	51.22				
	Total	100					
C. Critical thinking and decision-making	3-1 Model	50	47.48	1099.000	.268	Not Significant	Accept Ho
	2-1-1 Model	50	53.52				
	Total	100					
D. Technical knowledge and skills	3-1 Model	50	50.84	1233.000	.905	Not Significant	Accept Ho
	2-1-1 Model	50	50.16				
	Total	100					
E. Safety and emergency skills	3-1 Model	50	50.02	1226.000	.865	Not Significant	Accept Ho
	2-1-1 Model	50	50.98				
	Total	100					
F. Supervision and mentorship	3-1 Model	50	49.02	1176.000	.575	Not Significant	Accept Ho
	2-1-1 Model	50	51.98				
	Total	100					

For Hands-on Experience and Real-World Exposure, the computed Mann–Whitney U value was 1098.000 with a p-value of .265, which is greater than 0.05. This indicates that there is no significant difference between respondents under the 3-1 program scheme model and the 2-1-1 program scheme model in terms of acquiring hands-on experience and real-world exposure. Both apprenticeship schemes provided comparable practical learning experiences for the respondents.

In terms of Teamwork and Leadership, the computed Mann–Whitney U value was 1214.000 with a p-value of .794, indicating no significant difference between the two apprenticeship schemes. This means that both the 3-1program scheme model and 2-1-1 program scheme model similarly contributed to the development of teamwork and leadership skills among the respondents.

For Critical Thinking and Decision-Making, the computed Mann–Whitney U value was 1099.000 with a p-value of .268, which is higher than the 0.05 level of significance. This result indicates that there is no significant difference in the development of critical thinking and decision-making skills between respondents under the two apprenticeship schemes. Thus, the null hypothesis was accepted.

Regarding Technical Knowledge and Skills, the computed Mann–Whitney U value was 1233.000 with a p-value of .905, indicating no significant difference between the two groups. This implies that both apprenticeship schemes were equally effective in enhancing the respondents' technical knowledge and practical skills related to maritime education and training.

Similarly, for Safety and Emergency Skills, the computed Mann–Whitney U value was 1226.000 with a p-value of .865, which also showed no significant difference between the groups. This suggests that respondents from both apprenticeship schemes developed similar competencies in safety awareness and emergency preparedness.

Lastly, in terms of Supervision and Mentorship, the computed Mann–Whitney U value was 1176.000 with a p-value of .575, which is greater than 0.05. This indicates that there is no significant difference between the respondents' perceptions of supervision and mentorship under the 3-1 program scheme model and the 2-1-1 program scheme model. Both apprenticeship schemes provided relatively similar levels of guidance and support throughout the training process. A study emphasized that different maritime training structures and apprenticeship schemes can still produce comparable competency outcomes when both follow standardized competency-based education and training requirements. Manuel (2017). This indicate that the type of apprenticeship scheme, whether 3-1 program scheme model or 2-1-1 program scheme model, did not significantly influence the competency development of the respondents. Both schemes appear to be equally effective in developing the respondents' competencies in hands-on experience, teamwork and leadership, critical thinking and decision-making, technical knowledge and skills, safety and emergency skills, and supervision and mentorship.

Research Problem 4: Is there a significant difference on the career readiness of the respondents when they are grouped according to age, current status, Apprenticeship model, and duration of training?

Table 12: Results of significant difference on the career readiness of the respondents when they are grouped according to age

	Age	*N*	*Mean Rank*	*Chi-square*	*p-value*	*Remarks*	*Decision on Ho*
A. Job preparedness	18-24	75	49.19	1.590	.452	Not Significant	Accept Ho
	25-31	23	55.87				
	32-38	2	38.00				
	Total	100					
B. Confidence in performing shipboard tasks	18-24	75	47.67	3.080	.214	Not Significant	Accept Ho
	25-31	23	58.78				
	32-38	2	61.50				
	Total	100					
C. Adaptability to shipboard environment and culture	18-24	75	48.63	2.289	.318	Not Significant	Accept Ho
	25-31	23	54.48				
	32-38	2	75.00				
	Total	100					
D. Communication skills	18-24	75	50.33	2.131	.345	Not Significant	Accept Ho
	25-31	23	48.80				
	32-38	2	76.50				
	Total	100					
E. Professional growth and maturity	18-24	75	49.35	.957	.620	Not Significant	Accept Ho
	25-31	23	52.89				
	32-38	2	66.25				
	Total	100					
F. Learning environment, facilities, and support onboard	18-24	75	47.97	2.394	.302	Not Significant	Accept Ho
	25-31	23	57.70				
	32-38	2	62.75				
	Total	100					

Table 12 presents the results of the Chi-square test on the significant difference in the career readiness of the respondents when grouped according to age. The findings revealed that all computed p-values were greater than the 0.05 level of significance, indicating that there is no significant difference in the career readiness of the respondents across different age groups. Thus, the null hypothesis was accepted in all indicators.

For Job Preparedness, the computed chi-square value was 1.590 with a p-value of .452, which is greater than 0.05. This indicates that there is no significant difference in the respondents' level of job preparedness when grouped according to age. The result suggests that respondents from different age groups perceived themselves as similarly prepared for employment in the maritime industry.

In terms of Confidence in Performing Shipboard Tasks, the computed chi-square value was 3.080 with a p-value of .214, which also exceeded the 0.05 level of significance. Therefore, no significant difference was found among the respondents according to age. This implies that the respondents demonstrated comparable levels of confidence in carrying out shipboard duties regardless of their age group.

For Adaptability to Shipboard Environment and Culture, the computed chi-square value was 2.289 with a p-value of .318, indicating no significant difference among the groups. Hence, the null hypothesis was accepted. This means that respondents from different age groups possessed similar adaptability to the shipboard environment and maritime culture.

Regarding Communication Skills, the computed chi-square value was 2.131 with a p-value of .345, which is greater than 0.05. This result indicates that there is no significant difference in communication skills among respondents when grouped according to age. The findings suggest that respondents, regardless of age, developed relatively similar communication competencies necessary for maritime operations.

Similarly, for Professional Growth and Maturity, the computed chi-square value was .957 with a p-value of .620, indicating no significant difference among the age groups. Therefore, the null hypothesis was accepted. This suggests that respondents experienced comparable levels of professional growth and maturity regardless of their age.

Lastly, in terms of Learning Environment, Facilities, and Support Onboard, the computed chi-square value was 2.394 with a p-value of .302, which is greater than the 0.05 level of significance. This indicates that there is no significant difference among respondents according to age. The result implies that respondents perceived the onboard learning environment, facilities, and support similarly regardless of age group. A study Bailey (2015) that shipboard training experiences contribute similarly to cadets' confidence, adaptability, communication skills, and professional growth regardless of age group. The findings indicate that age did not significantly influence the career readiness of the respondents. Regardless of age group, the respondents demonstrated similar levels of job preparedness, confidence in performing shipboard tasks, adaptability to shipboard culture, communication skills, professional growth and maturity, and perceptions of the onboard learning environment and support.

Table 13 reveals the results of the Chi-square test on the significant difference in the career readiness of the respondents when grouped according to current status. The findings revealed that all computed p-values were greater than the 0.05 level of significance, indicating that there is no significant difference in the career readiness of the respondents according to their current status. Therefore, the null hypothesis was accepted in all indicators.

Table 13: Results of significant difference on the career readiness of the respondents when they are grouped according to Current Status

	Current Status	*N*	*Mean Rank*	*Chi-square*	*p-value*	*Remarks*	*Decision on Ho*
A. Job preparedness	Enrolled in Maritime School	70	51.39	1.237	.744	Not Significant	Accept Ho
	Graduate of Maritime School	21	46.07				
	Graduate of Maritime School	8	55.94				
	Others, pls specified	1	38.00				
	Total	100					
B. Confidence in performing shipboard tasks	Enrolled in Maritime School	70	51.77	1.902	.593	Not Significant	Accept Ho
	Graduate of Maritime School	21	44.64				
	Graduate of Maritime School	8	57.00				
	Others, pls specified	1	32.50				
	Total	100					
C. Adaptability to shipboard environment and culture	Enrolled in Maritime School	70	52.61	1.894	.595	Not Significant	Accept Ho
	Graduate of Maritime School	21	48.19				
	Graduate of Maritime School	8	39.44				
	Others, pls specified	1	40.00				
	Total	100					
D. Communication skills	Enrolled in Maritime School	70	51.14	1.608	.658	Not Significant	Accept Ho
	Graduate of Maritime School	21	49.64				
	Graduate of Maritime School	8	43.88				
	Others, pls specified	1	76.50				
	Total	100					
E. Professional growth and maturity	Enrolled in Maritime School	70	51.59	2.129	.546	Not Significant	Accept Ho
	Graduate of Maritime School	21	48.31				
	Graduate of Maritime School	8	42.81				
	Others, pls specified	1	81.50				
	Total	100					
F. Learning environment, facilities, and support onboard	Enrolled in Maritime School	70	47.21	3.126	.373	Not Significant	Accept Ho
	Graduate of Maritime School	21	57.45				
	Graduate of Maritime School	8	60.38				
	Others, pls specified	1	55.50				
	Total	100					

For Job Preparedness, the computed chi-square value was 1.237 with a p-value of .744, which is greater than 0.05. This indicates that there is no significant difference in the respondents' job preparedness when grouped according to current status. The result suggests that respondents, whether enrolled in maritime school, graduates, or classified under other categories, perceived themselves as similarly prepared for employment in the maritime industry.

In terms of Confidence in Performing Shipboard Tasks, the computed chi-square value was 1.902 with a p-value of .593, which also exceeded the 0.05 level of significance. Thus, no significant difference was found among the groups. This implies that respondents possessed comparable confidence levels in performing shipboard duties regardless of their current status.

For Adaptability to Shipboard Environment and Culture, the computed chi-square value was 1.894 with a p-value of .595, indicating no significant difference among the respondents according to current status. Therefore, the null hypothesis was accepted. This means that respondents exhibited similar adaptability to the shipboard environment

and maritime culture regardless of their educational or employment status.

Regarding Communication Skills, the computed chi-square value was 1.608 with a p-value of .658, which is greater than the 0.05 level of significance. This result indicates that there is no significant difference in communication skills among respondents grouped according to current status. The findings suggest that respondents developed relatively similar communication competencies necessary for maritime work.

Similarly, for Professional Growth and Maturity, the computed chi-square value was 2.129 with a p-value of .546, showing no significant difference among the groups. Therefore, the null hypothesis was accepted. This indicates that respondents experienced comparable levels of professional growth and maturity regardless of their current status.

Lastly, for Learning Environment, Facilities, and Support Onboard, the computed chi-square value was 3.126 with a p-value of .373, which is also greater than the 0.05 level of significance. This indicates that there is no significant difference among respondents in their perceptions of the onboard learning environment, facilities, and support based on current status. A study by Sampson and Tang (2015) that maritime trainees develop similar levels of operational competence, adaptability, communication skills, and professional behavior regardless of their educational or employment status. It emphasized that structured onboard training and shipboard experience are the key determinants of career readiness, rather than whether the individual is still studying or already a graduate. Indicate that current status did not significantly influence the career readiness of the respondents. Regardless of whether the respondents were currently enrolled in maritime school, graduates, or categorized otherwise, they demonstrated similar levels of job preparedness, confidence in performing shipboard tasks, adaptability to shipboard culture, communication skills, professional growth and maturity, and perceptions of the onboard learning environment and support.

Table 14: Results of significant difference on the career readiness of the respondents when they are grouped according to year of completion

	How long did you complete the apprenticeship scheme?	*N*	*Mean Rank*	*Chi-square*	*p-value*	*Remarks*	*Decision on Ho*
A. Job preparedness	Two (2) contract to complete the 1 year	8	48.88	7.402	.060	Not Significant	Accept Ho
	1 year	81	48.06				
	More than 1 year but less than 3 years	7	75.29				
	3 years or 36 months	4	59.75				
	Total	100					
B. Confidence in performing shipboard tasks	Two (2) contract to complete the 1 year	8	46.69	10.017	.018	Significant	Reject Ho
	1 year	81	47.45				
	More than 1 year but less than 3 years	7	76.29				
	3 years or 36 months	4	74.75				
	Total	100					
C. Adaptability to shipboard environment and culture	Two (2) contract to complete the 1 year	8	40.50	5.200	.158	Not Significant	Accept Ho
	1 year	81	49.17				
	More than 1 year but less than 3 years	7	66.71				
	3 years or 36 months	4	69.00				
	Total	100					
D. Communication skills	Two (2) contract to complete the 1 year	8	47.13	5.766	.124	Not Significant	Accept Ho
	1 year	81	48.46				
	More than 1 year but less than 3 years	7	69.79				
	3 years or 36 months	4	64.75				
	Total	100					
E. Professional growth and maturity	Two (2) contract to complete the 1 year	8	45.13	6.687	.083	Not Significant	Accept Ho
	1 year	81	48.33				
	More than 1 year but less than 3 years	7	72.79				
	3 years or 36 months	4	66.25				
	Total	100					
F. Learning environment, facilities, and support onboard	Two (2) contract to complete the 1 year	8	46.88	3.085	.379	Not Significant	Accept Ho
	1 year	81	49.71				
	More than 1 year but less than 3 years	7	68.07				
	3 years or 36 months	4	43.00				
	Total	100					

Table 14 presents the results of the significant difference in the career readiness of respondents when grouped according to the length of time they completed their apprenticeship scheme.

For job preparedness, respondents who completed the apprenticeship through two contracts obtained a mean rank of 48.88, those who completed it within 1 year had 48.06, respondents who completed it in more than 1 year but less than 3 years had the highest mean rank of 75.29, while those who completed it in 3 years or 36 months had 59.75. The computed Chi-square value of 7.402 with a p-value of 0.060 is greater than the 0.05 level of significance. Therefore, the result is not significant, leading to the acceptance of the null hypothesis. This indicates that the duration of apprenticeship completion does not significantly affect the respondents' level of job preparedness.

In terms of confidence in performing shipboard tasks, respondents who completed the apprenticeship through two contracts had a mean rank of 46.69, those who completed within 1 year had 47.45, respondents who completed it in more than 1 year but less than 3 years obtained the highest mean rank of 76.29, while those who completed it in 3 years

or 36 months had 74.75. The computed Chi-square value of 10.017 and p-value of 0.018 indicate a significant difference since the p-value is less than 0.05. Thus, the null hypothesis is rejected. This implies that the length of apprenticeship completion significantly influences the respondents' confidence in performing shipboard tasks. Respondents who spent a longer time completing the apprenticeship tended to demonstrate higher confidence levels, possibly due to prolonged exposure and greater practical experience onboard.

Regarding adaptability to the shipboard environment and culture, the computed Chi-square value of 5.200 with a p-value of 0.158 indicates no significant difference among the groups. Therefore, the null hypothesis is accepted. This means that respondents' adaptability to shipboard culture and environment does not significantly vary according to the duration of apprenticeship completion.

For communication skills, respondents showed no significant difference based on the duration of apprenticeship completion, as reflected by the Chi-square value of 5.766 and p-value of 0.124. The null hypothesis is therefore accepted. This suggests that communication skills were similarly developed regardless of how long respondents took to complete their apprenticeship.

In terms of professional growth and maturity, the Chi-square value of 6.687 with a p-value of 0.083 indicates a not significant result. Hence, the null hypothesis is accepted. This implies that the respondents' professional growth and maturity are not significantly influenced by the time taken to complete the apprenticeship scheme.

Lastly, for learning environment, facilities, and support onboard, the computed Chi-square value of 3.085 and p-value of 0.379 reveal no significant difference among the groups. Therefore, the null hypothesis is accepted, indicating that respondents generally perceived the onboard learning environment and support similarly regardless of apprenticeship completion duration.

Overall, the findings reveal that among the different dimensions of career readiness, only confidence in performing shipboard tasks showed a significant difference when respondents were grouped according to the length of apprenticeship completion. All other dimensions showed no significant difference.

The findings imply that the duration of apprenticeship completion generally does not affect most aspects of career readiness such as job preparedness, adaptability, communication skills, professional maturity, and perceptions of the learning environment. This suggests that maritime apprenticeship programs provide relatively consistent training outcomes regardless of whether cadets complete the program within the standard period or over an extended duration. However, the significant difference observed in confidence in performing shipboard tasks indicates that prolonged onboard exposure may contribute to higher levels of confidence among cadets. Respondents who spent more time completing their apprenticeship may have encountered more operational experiences, shipboard routines, and practical tasks, enabling them to become more confident in handling maritime responsibilities. The findings further imply that maritime institutions and shipping companies should continue providing quality practical training experiences that enhance cadets' confidence and operational competence. While extending apprenticeship duration may increase exposure and confidence, maritime schools should also ensure that cadets who complete training within the standard timeframe receive adequate practical engagement and simulation activities to strengthen their confidence levels. Moreover, the absence of significant differences in other dimensions indicates that career readiness is influenced not only by the length of apprenticeship but also by the quality of supervision, mentoring, training environment, and competency-based instruction provided during onboard training. Therefore, maritime institutions should focus on enhancing the overall quality and effectiveness of apprenticeship programs rather than merely emphasizing training duration.

Table 15: Results of significant difference on the career readiness of the respondents when they are grouped according to the Apprenticeship scheme

	Apprenticeship scheme Participation	*N*	*Mean Rank*	*Mann-Whitney U*	*p-value*	*Remarks*	*Decision on Ho*
A. Job preparedness	3-1 Model	50	49.13	1181.500	.603	Not Significant	Accept Ho
	2-1-1 Model	50	51.87				
	Total	100					
B. Confidence in performing shipboard tasks	3-1 Model	50	51.85	1182.500	.630	Not Significant	Accept Ho
	2-1-1 Model	50	49.15				
	Total	100					
C. Adaptability to shipboard environment and culture	3-1 Model	50	49.74	1212.000	.788	Not Significant	Accept Ho
	2-1-1 Model	50	51.26				
	Total	100					
D. Communication skills	3-1 Model	50	51.02	1224.000	.840	Not Significant	Accept Ho
	2-1-1 Model	50	49.98				
	Total	100					
E. Professional growth and maturity	3-1 Model	50	51.59	1195.500	.693	Not Significant	Accept Ho
	2-1-1 Model	50	49.41				
	Total	100					
F. Learning environment, facilities, and support onboard	3-1 Model	50	54.76	1037.000	.138	Not Significant	Accept Ho
	2-1-1 Model	50	46.24				
	Total	100					

Table 15 presents the results of the Mann–Whitney U Test on the significant difference in the career readiness of the respondents when grouped according to apprenticeship scheme participation, specifically the 3-1 program scheme model and the 2-1-1 program scheme model. The findings revealed that all computed p-values were greater than the 0.05 level of significance, indicating that there is no significant difference in the career readiness of the respondents between the two apprenticeship schemes. Therefore, the null hypothesis was accepted in all indicators.

For Job Preparedness, the computed Mann–Whitney U value was 1181.500 with a p-value of .603, which is greater than 0.05. This indicates that there is no significant difference between respondents under the 3-1 program scheme model and the 2-1-1 program scheme model in terms of job preparedness. The result suggests that both apprenticeship schemes similarly prepared respondents for employment in the maritime industry.

In terms of Confidence in Performing Shipboard Tasks, the computed Mann–Whitney U value was 1182.500 with a p-value of .630, which also exceeded the 0.05 level of significance. Thus, no significant difference was found between the two apprenticeship schemes. This implies that respondents from both models possessed comparable levels of confidence in carrying out shipboard duties.

For Adaptability to Shipboard Environment and Culture, the computed Mann–Whitney U value was 1212.000 with a p-value of .788, indicating no significant difference between the two groups. Therefore, the null hypothesis was accepted. This means that respondents from both apprenticeship schemes demonstrated similar adaptability to shipboard culture and working environments.

Regarding Communication Skills, the computed Mann–Whitney U value was 1224.000 with a p-value of .840, which is greater than the 0.05 level of significance. This result indicates that there is no significant difference in communication skills between respondents under the 3-1 program scheme model and the 2-1-1 program scheme model. The findings suggest that both apprenticeship schemes contributed equally to the development of communication competencies.

Similarly, for Professional Growth and Maturity, the computed Mann–Whitney U value was 1195.500 with a p-value of .693, showing no significant difference between the two groups. Hence, the null hypothesis was accepted. This implies that respondents from both apprenticeship schemes experienced comparable levels of professional growth and maturity throughout their training.

Lastly, for Learning Environment, Facilities, and Support Onboard, the computed Mann–Whitney U value was 1037.000 with a p-value of .138, which is also greater than the 0.05 level of significance. Therefore, no significant difference was found between the two apprenticeship schemes in terms of perceptions regarding the onboard learning environment, facilities, and support. This indicates that both schemes provided relatively similar onboard learning experiences and support systems for the respondents. A study concluded that competency-based maritime training systems produce uniform skill development among cadets regardless of program structure, as long as STCW-aligned standards are followed. Zadeh (2016). The results indicate that the type of apprenticeship scheme, whether the 3-1 program scheme model or the 2-1-1 program scheme model, did not significantly influence the career readiness of the respondents. Both apprenticeship schemes appeared equally effective in developing job preparedness, confidence in performing shipboard tasks, adaptability to shipboard culture, communication skills, professional growth and maturity, as well as perceptions of the learning environment and onboard support.

Research Problem 5: Is there a significant relationship on the profile and onboard training scheme to the competency development and career readiness of the respondents?

In Table 16, it presents the results of the significant relationship between the respondents' profile and onboard training scheme and their competency development using Spearman's Rho correlation analysis.

In terms of age, the results revealed no significant relationship between age and most dimensions of competency development, namely hands-on experience and real-world exposure ($\rho = -0.039$, $p = 0.702$), critical thinking and decision-making ($\rho = 0.144$, $p = 0.153$), technical knowledge and skills ($\rho = 0.163$, $p = 0.105$), safety and emergency skills ($\rho = 0.119$, $p = 0.239$), and supervision and mentorship ($\rho = 0.142$, $p = 0.159$). Hence, the null hypothesis for these variables was accepted. However, age showed a significant positive relationship with teamwork and leadership ($\rho = 0.232$, $p = 0.020$), leading to the rejection of the null hypothesis. This implies that as respondents become older, their teamwork and leadership competencies tend to improve, possibly due to greater maturity and social interaction experiences.

Table 16: Results of significant relationship on the profile and onboard training scheme to the competency development of the respondents

Spearman's Rho		***Competency Development***					
Profile and Onboard Training Scheme		***Hands-on experience and real-world exposure***	***Teamwork and leadership***	***Critical thinking and decision-making***	***Technical knowledge and skills***	***Safety and emergency skills***	***. Supervision and mentorship***
Age	Correlation Coefficient	-.039	.232*	.144	.163	.119	.142
	p-value	.702	.020	.153	.105	.239	.159
	Remarks	Not Significant	Significant	Not Significant	Not Significant	Not Significant	Not Significant
	Decision on Ho	Accept Ho	Reject Ho	Accept Ho	Accept Ho	Accept Ho	Accept Ho
Current Status	Correlation Coefficient	-.022	-.121	-.135	-.066	-.021	-.074
	p-value	.828	.232	.180	.516	.833	.465
	Remarks	Not Significant	Not Significant	Not Significant	Not Significant	Not Significant	Not Significant
	Decision on Ho	Accept Ho	Accept Ho	Accept Ho	Accept Ho	Accept Ho	Accept Ho
Apprenticeship scheme Participation	Correlation Coefficient	.112	.026	.111	-.012	.017	.056
	p-value	.267	.796	.270	.905	.866	.578
	Remarks	Not Significant	Not Significant	Not Significant	Not Significant	Not Significant	Not Significant
	Decision on Ho	Accept Ho	Accept Ho	Accept Ho	Accept Ho	Accept Ho	Accept Ho
How long did you complete the apprenticeship scheme?	Correlation Coefficient	.234*	.207*	.244*	.257**	.138	.101
	p-value	.019	.039	.015	.010	.171	.318
	Remarks	Significant	Significant	Significant	Significant	Not Significant	Not Significant
	Decision on Ho	Reject Ho	Reject Ho	Reject Ho	Reject Ho	Accept Ho	Accept Ho

Regarding current status, all competency development dimensions showed no significant relationship with the respondents' current status since all p-values were greater than 0.05. This indicates that whether respondents were enrolled students, graduates, or belonged to other categories did not significantly influence their competency development. Therefore, all null hypotheses under this variable were accepted.

For apprenticeship scheme participation, the findings also revealed no significant relationship with all dimensions of competency development. The correlation coefficients were very low and all p-values exceeded the 0.05 level of significance. This means that the type of apprenticeship model participated in by the respondents did not significantly affect their competency development. Hence, all null hypotheses were accepted.

On the other hand, the variable "How long did you complete the apprenticeship scheme?" showed significant positive relationships with several dimensions of competency development. Specifically, significant relationships were found with hands-on experience and real-world exposure ($\rho = 0.234$, $p = 0.019$), teamwork and leadership ($\rho = 0.207$, $p = 0.039$), critical thinking and decision-making ($\rho = 0.244$, $p = 0.015$), and technical knowledge and skills ($\rho = 0.257$, $p = 0.010$). Since the p-values were less than 0.05, the null hypotheses for these variables were rejected. This indicates that the length of apprenticeship completion is associated with higher levels of competency development in these areas. Respondents who spent longer periods completing the apprenticeship may have gained broader exposure, more practical experiences, and enhanced technical understanding.

However, no significant relationship was found between the duration of apprenticeship completion and safety and emergency skills ($\rho = 0.138$, $p = 0.171$) as well as supervision and mentorship ($\rho = 0.101$, $p = 0.318$). Thus, the null hypotheses for these variables were accepted. This suggests that safety competencies and mentorship experiences were relatively consistent regardless of how long respondents completed the apprenticeship scheme.

Overall, the findings indicate that among the profile and onboard training variables, the duration of apprenticeship completion had the strongest relationship with competency development, particularly in practical, technical, and leadership-related competencies.

The findings imply that demographic variables such as age and current status have limited influence on competency development among maritime trainees. This suggests that competency acquisition in maritime education is more dependent on practical training exposure and learning experiences than on personal characteristics. The significant relationship between age and teamwork and leadership indicates that maturity may contribute to stronger interpersonal and leadership abilities. Maritime schools may therefore consider integrating more collaborative and leadership-building activities for younger cadets to further strengthen these competencies early in training. The absence of significant relationships between apprenticeship model participation and competency development suggests that both apprenticeship schemes implemented by maritime schools are generally effective in providing comparable competency outcomes. This implies that the quality of implementation and training experiences may be more important than the type of apprenticeship model itself. Furthermore, the significant relationships between the duration of apprenticeship completion and several competency dimensions indicate that prolonged onboard exposure contributes positively to competency enhancement. Longer apprenticeship experiences may allow cadets to encounter more operational tasks, practical situations, and technical responsibilities that improve their skills and confidence. However, since safety and emergency skills and supervision and mentorship did not significantly relate to apprenticeship duration, the findings imply that these competencies are consistently emphasized across all training durations. This reflects the standardized

implementation of maritime safety training and mentorship practices onboard vessels.

Overall, the study highlights the importance of sustained practical exposure, experiential learning, and quality onboard training in enhancing maritime competency development. Maritime institutions and shipping companies should therefore continue strengthening apprenticeship programs, onboard mentoring systems, and competency-based training approaches to ensure that cadets acquire the necessary skills and preparedness for future maritime careers.

In Table 17, it shows the results of the Spearman's Rho test on the significant relationship between the profile and onboard training scheme variables and the career readiness of the respondents. The analysis examined whether age, current status, apprenticeship scheme participation, and length of apprenticeship completion were significantly related to the respondents' career readiness indicators. The findings revealed that most variables showed no significant relationship with career readiness, except for the length of time in completing the apprenticeship scheme, which demonstrated significant relationships with selected indicators.

Table 17: Results of significant relationship on the profile and onboard training scheme to the career readiness of the respondents

Spearman's Rho		***Career Readiness***					
Profile and Onboard Training Scheme		***Job preparedness***	***Confidence in performing shipboard tasks***	***Adaptability to shipboard environment and culture***	***Communication skills***	***Professional growth and maturity***	***.Learning environment, facilities, and support onboard***
Age	Correlation Coefficient	.079	.176	.123	.023	.078	.155
	p-value	.433	.079	.224	.820	.442	.123
	Remarks	Not Significant	Not Significant	Not Significant	Not Significant	Not Significant	Not Significant
	Decision on Ho	Accept Ho	Accept Ho	Accept Ho	Accept Ho	Accept Ho	Accept Ho
Current Status	Correlation Coefficient	-.040	-.056	-.125	-.039	-.059	.176
	p-value	.694	.579	.213	.701	.557	.079
	Remarks	Not Significant	Not Significant	Not Significant	Not Significant	Not Significant	Not Significant
	Decision on Ho	Accept Ho	Accept Ho	Accept Ho	Accept Ho	Accept Ho	Accept Ho
Apprenticeship scheme Participation	Correlation Coefficient	.052	-.048	.027	-.020	-.040	-.149
	p-value	.606	.633	.789	.842	.695	.139
	Remarks	Not Significant	Not Significant	Not Significant	Not Significant	Not Significant	Not Significant
	Decision on Ho	Accept Ho	Accept Ho	Accept Ho	Accept Ho	Accept Ho	Accept Ho
How long did you complete the apprenticeship scheme?	Correlation Coefficient	.194	.256*	.220*	.196	.220*	.093
	p-value	.053	.010	.028	.050	.028	.360
	Remarks	Not Significant	Significant	Significant	Significant	Significant	Not Significant
	Decision on Ho	Accept Ho	Reject Ho	Reject Ho	Reject Ho	Reject Ho	Accept Ho

For Age, all computed p-values were greater than the 0.05 level of significance, with correlation coefficients ranging from .023 to .176. This indicates that age has no significant relationship with job preparedness, confidence in performing shipboard tasks, adaptability to shipboard environment and culture, communication skills, professional growth and maturity, and learning environment, facilities, and support onboard. Therefore, the null hypothesis was accepted in all indicators. The results imply that the respondents' career readiness was not influenced by their age.

Similarly, for Current Status, all p-values exceeded the 0.05 level of significance, with correlation coefficients ranging from -.125 to .176. This indicates that current status has no significant relationship with any of the career readiness indicators. Hence, the null hypothesis was accepted in all areas. The findings suggest that whether respondents were enrolled in maritime school, graduates, or categorized otherwise did not significantly affect their level of career readiness.

In terms of Apprenticeship Scheme Participation, the computed correlation coefficients ranged from -.149 to .052, while all p-values were greater than 0.05. This indicates that there is no significant relationship between participation in the 3-1 Model or the 2-1-1 Model and the respondents' career readiness indicators. Therefore, the null hypothesis was accepted in all indicators. The findings imply that both apprenticeship schemes similarly contributed to the respondents' readiness for maritime careers.

However, for How Long the Respondents Completed the Apprenticeship Scheme, the findings revealed both significant and non-significant relationships. For Job Preparedness, the correlation coefficient was .194 with a p-value of .053, indicating no significant relationship since the p-value is slightly greater than 0.05. Thus, the null hypothesis was accepted.

For Confidence in Performing Shipboard Tasks, the correlation coefficient was .256 with a p-value of .010, which is less than 0.05. This indicates a significant positive relationship between the duration of apprenticeship completion and confidence in performing shipboard tasks. Therefore, the null hypothesis was rejected. The result suggests that respondents who spent longer periods

completing the apprenticeship scheme tended to have higher confidence in carrying out shipboard responsibilities.

For Adaptability to Shipboard Environment and Culture, the correlation coefficient was .220 with a p-value of .028, indicating a significant positive relationship. Hence, the null hypothesis was rejected. This implies that longer apprenticeship completion may contribute to better adaptability to shipboard culture and working conditions.

In terms of Communication Skills, the correlation coefficient was .196 with a p-value of .050, which was interpreted as significant in the study. Therefore, the null hypothesis was rejected. The result suggests that the duration of apprenticeship completion may influence the development of communication skills among respondents.

Similarly, for Professional Growth and Maturity, the correlation coefficient was .220 with a p-value of .028, indicating a significant positive relationship. Thus, the null hypothesis was rejected. This finding implies that respondents who spent more time completing the apprenticeship scheme tended to demonstrate greater professional growth and maturity.

Lastly, for Learning Environment, Facilities, and Support Onboard, the correlation coefficient was .093 with a p-value of .360, which is greater than 0.05. This indicates no significant relationship between the duration of apprenticeship completion and respondents' perceptions of the onboard learning environment and support. Therefore, the null hypothesis was accepted.

Overall, the Spearman's Rho test revealed that age, current status, and apprenticeship scheme participation had no significant relationship with the career readiness of the respondents. However, the duration of apprenticeship completion showed significant positive relationships with confidence in performing shipboard tasks, adaptability to shipboard environment and culture, communication skills, and professional growth and maturity. This suggests that extended apprenticeship experience may contribute positively to certain aspects of career readiness among maritime students and graduates.

Research Problem 6: Based on the findings, what enhancement plan can be proposed to improve the onboard training schemes of maritime schools?

The results of the research indicate that the onboard training programs under the 3-1 and 2-1-1 schemes of Maritime Higher Education Institutions (MHEIs) in the Zamboanga Peninsula were successful in developing core competencies and preparing cadets to become career ready; however, there was room for improvement in the areas of access to training materials, sufficiency of engine-watchkeeping experience, consistent mentorship, and consistent training quality between vessels. The intent of this intervention design is to enhance these deficits, strengthen current practices, and align the training programs to the international standards established by CHED, MARINA, and STCW. This will provide cadets with comprehensive, high-quality, and consistent onboard training, resulting in them becoming globally competitive maritime professionals.

I. Title of the Intervention Design

Enhancement Program for Onboard Training Schemes: Standardization, Resource Support, and Competency-Based Mentorship Framework.

II. Rationale

The research showed that although cadets rated their overall competence development/career readiness as very high, substantial deficits existed: lack of access to learning materials or resources; limited exposure to engine-watchkeeping duties; differences in the quality of supervisory oversight; and different types of training experiences on different types of vessels. These deficiencies may impede the total accumulation of proficiency and adherence to STCW standards. The 3-1 and 2-1-1 schemes are designed to achieve an identical objective in combining theoretical knowledge with hands-on training and have a similar result in that using a consolidated model to enhance both would benefit both schemes. The theoretically developed model will be based on Experiential Learning Theory (Kolb) and Situated Learning Theory (Lave) in that creating structured learning opportunities through guided mentorship and readiness to learn through resource availability are vital to the successful acquisition of skills. Developing solutions to these issues will lead to improved outcomes in training and a more consistent method of obtaining skills that will be achieved through adherence to the international and national standards for maritime education and training.

III. Objective

This plan will create an overall enhancements plan for onboard training using the 3-1, 2-1 -1 systems and will improve the quality, standardization of resources, and delivery of training. The goal is to address any identified gaps in Resource, Mentor, Provider, and Monitoring Systems; maximizing competency development and career readiness of maritime cadets.

Planning Matrix

Area of Concern / Key Result Areas (KRA)	Specific Objective	Strategy	Time Frame	Target	Person Responsible	Monitoring Mechanism	Resources	Expected Output	Percentage Indicator
1. Learning Resources and Materials Support	To provide complete, accessible, and standardized learning materials and references onboard to support	• Develop and distribute a Standardized Onboard Training Resource Kit aligned with STCW requirements and Training	6 months (Phase 1: Development; Phase 2: Distribution)	100% of training vessels and cadets have access to complete, updated learning resources	• MHEI Training Directors • MARINA Accreditation Officers • Shipping Company Training Officers	• Monthly inventory check • Cadet feedback survey • TRB completion review	• Budget for printing and digital tools • Technical writers / Maritime experts • Partnership	• Standardized Resource Kit • Digital learning repository • Documented access records	95% of cadets report Satisfactory to Very High access to materials

	theoretical-practical integration	Record Book (TRB) • Digitize materials (manuals, guides, videos) and provide access via tablets or shared drives • Establish a system for replenishment and update of materials					with shipping companies		
2. Practical Exposure: Engine-Watchkeeping and Technical Tasks	To ensure adequate, consistent, and structured exposure to engine-watchkeeping, deck operations, and all required technical competencies as per curriculum	• Revise onboard training checklist to include minimum hours and tasks for each competency (including engine-watchkeeping) • Implement rotation system: cadets assigned to all key operational areas (deck, engine, safety, navigation) • Coordinate with shipping companies to assign cadets to vessels with complete operational facilities	8 months	100% of cadets complete required hours and tasks for all core competencies before finishing training	• MHEI Curriculum Committee • Shipping Company Fleet Managers • Designated Shipboard Mentors	• Weekly task log review • Mid-training progress assessment • Final competency evaluation	• Revised training manuals • Partnership agreements with shipping firms • Training vessels with full equipment	• Updated Training Record Book • Completion reports • Competency certificates	90% of cadets rate technical exposure as High to Very High
3. Mentorship and Supervision System	To standardize mentorship quality, ensure qualified supervisors, and provide consistent guidance to all cadets across vessels	• Develop a Mentor Qualification and Training Program for shipboard officers • Assign 1:1 or 1:2 mentor-cadet ratio • Create structured daily/weekly mentoring sessions and feedback mechanisms • Conduct pre-training orientation for mentors on learning objectives	5 months	All onboard mentors are trained, qualified, and follow a standardized mentoring process	• MHEI Faculty Trainers • MARINA Training Officers • Chief Officers / Chief Engineers	• Mentor performance evaluation • Cadet feedback forms • Spot checks by school representatives	• Training modules for mentors • Certificates of qualification • Guidelines document	• Trained and certified mentors • Standardized mentoring logs • Feedback reports	92% of cadets report Strongly Agree on quality of supervision
4. Standardization of Training Implementation (3-1 and 2-1-1 Schemes)	To align both training schemes with uniform standards, while	• Develop unified implementation guidelines for both 3-1 and 2-1-1 models,	4 months	100% of MHEIs and partner shipping companies follow the	• MHEI Administrators • CHED / MARINA Regional	• Compliance audit • Implementation reports • Stakeholder	• Policy manuals • Orientation materials •	• Unified Implementation Manual • Compliance certificates • Standardized	100% compliance of participating institutions

	preserving their unique structural objectives	detailing academic vs. onboard requirements • Conduct orientation for schools, shipping partners, and cadets on the guidelines • Establish a joint monitoring team for both schemes		standardized guidelines	Officers • Program Coordinators	meetings	Monitoring checklists	training reports	to guidelines
5. Monitoring, Evaluation, and Continuous Improvement	To establish a systematic process for regular assessment, feedback, and enhancement of onboard training programs	• Implement pre-training, mid-training, and post-training evaluation • Create a feedback loop: cadets, mentors, and schools share input after every deployment • Conduct annual program review and adjustment based on data	Ongoing / Annual Cycle	Continuous improvement of training quality; timely resolution of issues	• Research and Evaluation Team • Training Coordinators • Industry Advisory Board	• Evaluation forms • Data analysis reports • Annual program review meetings	• Data management system • Evaluation tools • Budget for research and review	• Evaluation reports • Annual improvement plan • Updated policies	100% of identified issues addressed within 3 months
6. Supportive Learning Environment and Welfare	To ensure safe, conducive, and supportive working and learning conditions onboard vessels for all cadets	• Enforce MARINA/STCW standards for safety, accommodation, and fair treatment • Establish a grievance and support mechanism for cadets • Conduct pre-departure training on welfare, rights, and onboard support	3 months	Zero reported cases of unfair treatment; 100% compliance with safety and welfare standards	• Shipping Company HR / Safety Officers • MHEI Student Affairs Office • Crew Welfare Officers	• Welfare surveys • Incident report system • Safety compliance audit	• Welfare guidelines • Support hotline / contact system • Safety training materials	• Welfare compliance reports • Incident-free records • Positive environment feedback	94% of cadets rate learning environment as High to Very High

5. Conclusions and Recommendations

This chapter present the conclusions and recommendations draw from the analysis and interpretations as well as the recommendations to further improve the onboard training program of study scheme of maritime education program.

Conclusions

Based on the findings, the following conclusions were drawn:

1. The onboard training programs, both the 3-1 and 2-1-1 schemes, were highly effective in developing the core competencies required for maritime professionals. Respondents demonstrated a "Very High" level of development across all measured dimensions.
2. Respondents exhibited a "Very High" level of career readiness, signifying that the apprenticeship programs successfully prepared them for the demands of the maritime profession. Cadets reported high job preparedness, confidence, and adaptability, demonstrating capability in adjusting to rigorous working conditions, multicultural environments, and the discipline required at sea. They also showed highly developed communication skills and professional maturity, which are essential traits for safe operations and effective teamwork. However, specific gaps were identified, particularly in the availability of learning materials and references rated as "Very Low," and structured exposure to engine-watchkeeping duties rated as "Low."
3. There was no significant difference in the competency development of respondents when grouped according to age, current status, type of apprenticeship model (3-1 vs 2-1-1), or duration of training.

4. There was no significant difference on the career readiness of the respondents when they are grouped according to age, current status, apprenticeship model, and duration of training.
5. There was a significant relationship between the implementation of the onboard training scheme and the resulting levels of competency development and career readiness.
6. An enhancement plan was deemed necessary to improve onboard training. It aimed to maintain strengths like safety training, mentorship, and leadership while addressing gaps such as limited learning materials and insufficient engine-watchkeeping exposure. Key measures included standardizing task rotation, providing digital resources, and strengthening monitoring. Both the 3-1 and 2-1-1 programs were retained as effective models. This plan guided institutions and partners to meet global standards and helped sustain the Philippines' reputation for producing skilled seafarers.

Recommendations

Based on the findings and conclusions of the study, the following recommendations are offered:

Government Agencies (CHED, MARINA, and other regulatory bodies)

It is recommended that government agencies such as CHED and MARINA standardize policies and strictly monitor the implementation of both the 3-1 and 2-1-1 programs to ensure full compliance with STCW standards. They should also strengthen partnerships with the industry to secure enough training berths, guarantee consistent quality of mentorship, and ensure all cadets gain complete exposure to essential duties like engine watchkeeping within the standard one-year training period.

Maritime Higher Education Institutions (MHEIs)

It is recommended that Maritime Higher Education Institutions adopt best practices from both program schemes, such as adding review modules for the 3-1 model and enhancing foundational training for the 2-1-1 model. Schools must also provide sufficient learning materials and guides before deployment, formalize agreements with shipping companies to ensure quality supervision, and establish a system to regularly track and support cadet progress while onboard.

Students and Cadets

It is recommended that students and cadets actively take charge of their learning by participating fully in all shipboard operations, mastering both technical and safety skills, and using every opportunity to apply their theoretical knowledge. They are also encouraged to develop discipline, adaptability, and professional work attitudes, while providing honest feedback regarding training gaps to help improve future programs.

Future Researchers

It is recommended that future researchers expand the study to cover more institutions and regions to validate these findings further. They may also conduct long-term studies to track career performance of graduates, include feedback from shipping companies, and investigate deeper into specific issues such as resource availability and mentorship quality to develop more effective training models.

6. Dedication

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