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NAVIGATIONAL COMPETENCIES OF OFFSHORE VESSEL CADETS CONSISTENT WITH THE STANDARDS FOR TRAINING, CERTIFICATION, AND WATCHKEEPING (STCW '95) MINIMUM REQUIREMENTS

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ABSTRACT: *This study investigated the offshore vessel cadets' navigational competencies per STCW minimum requirement in the Maritime Education College of the University of Cebu Lapu-lapu and Mandaue. Categorically, this study determined the respondents' profile in terms of age, gender, type of offshore vessel boarded, and trade routes. Furthermore, the study determined the relationship between profile and the cadets' acquired competencies and recommendations. The researchers used the descriptive-correlational method to conduct this study. There were thirty-two BSMT offshore vessel cadets chosen as respondents. The study was conducted at the University of Cebu-Lapu-lapu and Mandaue. To gather the data needed, the researchers used STCW-based researchers made checklist form. Frequency count, percent, mode, and weighted mean were used to treat the data collated. The study revealed a notable gap between the acquired navigational competencies and the STCW requirement in the area of; planning and conducting a passage, using radar and ARPA to maintain the safety of navigation, and transmitting and receiving information by visual signaling. It also determined the recommendations of the cadets and established that there is a significant relationship between the profile in terms of types of vessel boarded and the acquired competencies like the use of radar and ARPA to maintain the safety of navigation, respond to a distress signal at sea, use of IMO standard marine communication phrases, and maneuvering the ship. These findings led to the conclusion that the success of producing quality seafarers is the primary responsibility of the maritime institute to ensure a globally competitive STCW '95 (Standards for Training, Certification, and Watchkeeping) - compliant maritime education graduates.*

Keywords*-Offshore vessel, navigation, competencies, passage plan, visual signaling*

I. INTRODUCTION

Energy has long been considered a substantial driver of economic growth, and traditional energy demand, following an upward trend for many decades (Sadorsky, 2009; Ellabban et al., 2014; Yilanci et al., 2021). Energy remains the lifeblood of our economy, powering our factories and communities, heating and cooling our homes, and moving people and goods. We rely on oil and gas to supply two-thirds of our energy needs. Fuels derived from oil and gas provide virtually 100 percent of our transportation demand and an ever-increasing proportion of our electricity.

The oil and petroleum industry has transformed into a highly technological industry. Dramatic technological advances for exploration, drilling and completion, production, and site restoration have enabled the industry to keep up with the ever-increasing demand for reliable supplies of oil and natural gas at reasonable prices (U.S. House of Representatives, 2009). With this new demand, the shipping industry worldwide has also evolved and adapted to meet the challenges of exploration and production of offshore oil and gas fields. The result has been many changes in the construction, operation, and management of the ships suited for this purpose.

With the rising offshore drilling and production activities, the demand for offshore rigs platforms and support vessels is also increasing.

Offshore oil platform support vessels, commonly known as offshore vessels, are ships that specifically serve operational purposes such as oil exploration and construction work on the high seas (Karan, C. 2019). The size of these vessels ranges between 20 meters and 100 meters. They are good at accomplishing a variety of tasks in the supply chain. The category may includeplatform supply vessels (PSV), offshore barges,and all types of specialty vessels, including anchor handling vessels,drilling vessels**,** well intervention vessels, ice-breaking

vessels, cable laying vessels, seismic vessels, and fire fighting vessels **(**First Oil and Gas Services, 2022).

Among the vessels commonly utilized by the offshore oil industry are the platform supply vessels or PSVs, anchor handling tugs, and the classic barges. A platform supply vessel is a type of offshore vessel mainly used for transiting essential equipment and additional workforce to reinforce the high seas' operations. Under a broader ambit, supply vessels help carry not just heavy structural equipment but also smaller yet essential structural components like paving material (cement and concrete) and chemical compounds that help in efficient sub-water boring operations. In addition, these supply vessels transported food and provisions for the crew and personnel working on the high seas.

The anchor handling tug is a vessel that is solely concerned with the objective of either tugging or towing an oil rig or a ship. When it comes to oil rigs, these tugs form the necessity as, without their help, it would be impossible to place oil rigs in the required sea and marine areas. Anchor Handling Tug Supply (AHTS) vessels, on the other hand, are a type of supply vessels that supply tugs and anchors to not just oil rigs but also to cargo-carrying barges. Technically, an AHTS is a huge vessel, mainly because of its types of equipment – like tugs and anchors along with the winches.

A classic barge is very similar to a huge raft. In many cases, a barge is un-powered and has to move with the assistance of a tugboat. In this situation, the captain and first mate are aboard the tugboat, not the barge, as the tugboat provides the power and steering for the barge. The regular operation of these ships based on their functions will disallow them to engage in longer sea voyages. As a result, there is a limited opportunity for the deck crew and the cadets to practice and experience the practical aspect of navigation that will help them acquire navigational competence.

The term competence may refer to the combination of practical and theoretical knowledge, cognitive skills, behavior, and values used to improve performance or the state or quality of being adequately or well qualified to perform a specific role. For a person aspiring to become a merchant ship officer, the Code on Standards of Training, Certification, and Watchkeeping (STCW) 1995, as amended, sets a minimum standard of competencies to be acquired in the area of navigation, seamanship, controlling of operations, and safety through a prescribed period of cadetship.

For navigation, the minimum requirement includes: the planning and conducting passage and determination of position, maintaining a safe navigational watch, utilizing radar and Automatic Radar Plotting Aid (ARPA), responding to emergencies, responding to a distress signal at sea, using IMO Standard Marine Communication Phrases, transmitting and receiving information by visual signaling, and maneuvering of the ship.

Before endorsement by the maritime institution as qualified to graduate and take the licensure examination. A student who finished onboard cadetship for deck or engine shall submit evidence of his or her competency through the maritime school's Onboard Training Office, the training record book. Afterward, demonstrates his or her competency by undergoing the computer-based and panel interview assessment (CMO 70 Series 2017).

Observation made on the performance of cadets who undergo cadetship onboard OffShore vessels in the computer-based examination and panel interview assessment indicated an alarming trend that they were having difficulties specifically in navigation. It is essential to gather data and information to determine if compliance with the minimum STCW requirement has been attained. Limited competency, or if there is a gap from the requirement, will result in deficiency in the pre-determined set of competencies that a cadet shall demonstrate to authorities as a component of becoming an officer.

On this premises, the researchers studied the offshore vessel cadets' navigational competencies vis-a-vis STCW '95 as amended minimum requirements. The goal was to determine what component of the navigational competencies the cadets could not acquire during their onboard training.

II. OBJECTIVES OF THE STUDY

The study aimed to determine the offshore vessel cadets' navigational competencies under Table ll/l of the Standards of Training, Certification, and Watchkeeping (STCW) 1978. Furthermore, the study sought to ascertain the respondents' recommendations to enhance their technical competencies to perform better in conventional vessels. The researchers also discerned the relationship between the respondents' profile and the Function 1 technical competencies.

III. METHODOLOGY

In determining the offshore vessel cadets' navigational competencies under Table ll/l of the Standards of Training, Certification, and Watchkeeping (STCW) 1978 as amended, theresearchers utilized quantitative-correlational research in the method of inquiry. Concerning its objectives, the researchers classified this study under the descriptive type of research. The implementation of this investigation is under the applied research category.

The researchers conducted this investigation at the University of Cebu Lapulapu and Mandaue (UCLM) campus, specifically, within the premises of the On Board Training Office. The University's site is near the entrance of the old Mactan Bridge going to Lapulapu City. The University offers several courses, including a Bachelor of Science in Marine Transportation (BSMT) and a Bachelor of Science in Marine Engineering (BSMaRE). The respondents of this study were thirty-twoBS Marine Transportation cadets whohad taken their twelve (12) months of apprenticeship or cadetship training on board offshore vessels of various functions from 2014 to 2019.

In collecting the data vital for the attainment of the objectives of this study, the researchers utilized a researcher-made instrument that went through validation by the pool of selected BSMT instructors and assessors. The research instrument contained two parts. The first part is about the profile of the respondents concerning age, gender, type of offshore vessel, and trade routes. The second is the checklist for the required navigational competencies. Statistically, the research instruments were sound. For the analysis and interpretation of the data, the researchers used simple frequency, percentage. mode, weighted mean, and Chi- square.

In the conduct of the gathering of data, the researchers strictly followed the standard ethical principles of research. Four basic principles were observed: the principle of respect for persons, beneficence, informed consent, and justice. For the observance of respect to persons, the researchers treated the respondents as autonomous agents, and the respondents with diminished autonomy were entitled to protection. In affording beneficence, respondents were treated ethically by respecting their decisions and protecting them from harm, but also by ensuring to secure their well-being. For informed consent, the respondents were given the appropriate information about the research comprehensively without duress or inappropriate inducement. Lastly, the principle of justice was applied. The researchers followed fairness in the distribution, or "what is deserved" was observed in the treatment of the subjects. Careful consideration was given to the overall societal impact of the study in selecting the participants and the benefits and burdens arising from it.

The researchers notified the respondents about the study's aims, methods, and anticipated benefits. They were also informed of their: (a) right to abstain from participation, (b) right to terminate at any time their participation, and (c) the confidentiality of their answers. No cadet became a respondent of this study unless they had given the notice mentioned above and freely given their consent to participate. Pressure or inducement was not applied to encourage the cadet to become a respondent. The researchers ensured confidentiality by strictly following the principles of keeping the responses private and for study use only.

IV. RESULTS AND DISCUSSIONS

This section present interprets and analyzes the data collected during the research. The data pertain to the profile, the competencies, recommendations, and the relationship between the respondents' profile and competencies.

Profile of the Subjects
Table 1
Profile of the Subjects

Age	Frequency	Percent
19	3	9.38
20	18	56.35
21	7	21.88
22	4	12.50
Total	**32**	**100.00**
Gender		
Male	32	100.00
Female	0	0.00

Total		**32**	
100.00			
Type of Offshore Vessel			
Platform Supply	16		50.00
Anchor Handling	6		18.75
Offshore Barge		9	
28.13			
Survey Vessel		1	
3.13			
Total		**32**	
100.00			
Trade Route			
Arabian Sea		5	
15.63			
Gulf of Mexico		3	
9.38			
Indian Ocean		6	
18.75			
Kuwait		1	
3.13			
Persian Gulf		9	
28.13			
Red Sea	2		6.25
Suluf Field		5	
15.63			
Tan-Ajib Field		1	
3.13			
Total		**32**	
100.00			

As shown in Table 1, most respondents with their cadetship onboard an offshore vessel are twenty years old, comprising 56.25% or 18 of the total respondents. This result may be because most of the respondents are Norwegian Shipowners Association (NSA) cadets who enrolled in the program in their 17th year and went onboard after two years of academic study. Thus, upon disembarkation, they are already twenty years old.

Regarding gender, the study revealed that the respondents who boarded an offshore vessel from 2012 to 2016 were all males. The ratio of male and female enrollees in maritime education further proved that the maritime profession is a male-dominated domain.

According to Hellenic Shipping News Worldwide (2021), the International Maritime Organization (IMO) noted that women represent less than two percent of the world's estimated 1.2 million seafarers. Ninety-four percent of them work in the cruise industry, and 6 percent are employed on cargo vessels, container ships, or oil tankers. IMO secretary-general Kitack Lim said the maritime industry needs more women because of the quality work they provide as they are vital human resources.

While recognizing that there is still a long way to go to achieve gender equality in the maritime industry, gradual but encouraging progress has been made in this area, particularly over the last decade. Programs, researches, and resolutions are now in place and facilitated through organizations such as the International Maritime Organization (IMO), the International Transport Federation (ITF), the International Labor Organization (ILO), and the International Seafarers Welfare and Assistance Network (ISWAN), among others (Pike, K. et al. 2016).

In the type of offshore vessel, 50% or 16 respondents answered platform supply vessel. This support vessel is the most commonly used in offshore operations due to its function and services. The offshore barge support vessel, which has several functions and services similar to a platform supply vessel, follows by registering 9 or 28.13% of the respondents.

Of the eight trade routes supplied by the respondents, the Indian ocean garnered the most by obtaining 18.75%, followed by the Arabian Sea and Suluf Field with 15.63%. Interestingly, that most trade routes are

within the Arab region. The reason is maybe due to the company that owned the offshore vessel or the charterer of the vessels.

Respondents' Acquired Deck Function 1 Technical Competencies

This section presents the acquired Deck Function 1 technical competencies by the respondents. Table 2 summarizes the respondents' competencies in planning and conducting a passage and determining the ship's position.

Table 2
Respondents' Acquired Deck Function 1 Technical Competencies in Terms of Planning and Conducting a Passage and Determining Position

Indicators	Mean (N=32)	Description	Interpretation
1. Consult navigational publication	1.57	Never	Not Competent
2. Select chart of adequate scale	1.97	Seldom	Competent
3. Set courses	2.07	Seldom	Competent
4. Calculate Estimated Time of Arrival (ETA)	2.47	Always	Competent
5. Determine and apply compass error for courses and compass bearings	1.52	Never	Not Competent
6. Recognize conspicuous objects and other terrestrial aids to navigation in daylight and at night	2.05	Seldom	Competent
7. Use azimuth mirror and sextant to fix ship's position by terrestrial observations	1.13	Never	Not Competent
8. State ship's position by dead reckoning	2.32	Seldom	Competent
9. Determine the most probable position of the ship by observing the sun, stars or planets	1.67	Seldom	Competent
Overall Mean	**1.86**	**Seldom**	**Competent**

Table 2 reflects the established deficiencies in the required minimum navigational competency under planning, conducting a passage, and determining position. Out of the nine tasks, the respondents determined three that they never do on board the offshore vessels they were onboard.

First is the task of using an azimuth mirror and sextant to fix the ship's position by terrestrial observations, which got the lowest mean of 1.13. The second is to determine and apply compass error for courses and compass bearings which obtained a mean of 1.52, and the last is to consult navigational publication, which got a mean of 1.57. The mean the three tasks got corresponds to a statistical description of never performed.

The deficiencies of the respondents are primarily due to the transit time or travel time from the port to the oil rig and vice-versa, which will only last very short compared to a conventional vessel. Another factor to consider is the modern navigational equipment on board the offshore vessels. Thus, traditional navigational routine is not commonly practiced. Moreover, since the route is similar to a liner, the visual familiarity of the area
negates the need to consult navigational publications or to check for compass errors continuously. Although there are only three tasks that the cadets could not perform, it is still essential to look for remediation to ensure the acquisition of the required competencies.

Maritime Education and Training (MET) plays a crucial role in instilling the seafarers' required skills and competencies in seafarers to perform efficiently in their workplaces (Basak, S.K. 2017; Tusher, H.M. et al., 2021). Better on-the-job performance of the involved personnel depends on their high-quality education and training, whereas sub-standard training leads to accidents

and incidents in ships (Chauvin, C. et al., 2013). Differing statistics show how human error constitutes the majority of contributing factors in maritime accidents (Harati-Mokhtari, A. et al., 2007).

As a result of the emphasis on human error in theshipping industry, maritime education and training have been the primary measure to reduce casualties (ILO, 1996; Psaraftis et al., 1998; Berg et al., 2013; Mazhari, S. 2018). Without losing sight of other factors, the IMOconsiders that human resources are the most important factor for safe and efficient shipping(O'Neil, 2001).

With the introduction of the STCW amendment in 1995, the global shipping industry aimed for a clear and a globally standard set of requirements for the education, training, and certification of seafarers as well as the procedures the maritime administrations must carry out in the uniform implementation of the requirements.

However, about two decades since the introduction of the STCW 1995, leaving aside the debate of sufficiency and effectiveness of the 'minimum requirements of education and training introduced by the STCW Convention, there still often remained substantial variations in the standards of supervision, curricula content, and overall quality of training institutions and, in particular, the quality of the competency of seafarers (Alderton et al., 2004; Mazhari, S. 2018).

Respondents' Acquired Deck Function 1 Technical Competencies

Table 3 presents the respondents' competencies in maintaining a safe navigational watch.

Table 3

Respondents' Acquired Deck Function 1 Technical Competencies in Terms of Maintaining a Safe Navigational Watch

Indicators	Mean (N=32)	Description	Interpretation
1. On preparing for sea, check ship's draft that the necessary bridge equipment is operational and that proper sailing information is available	2.57	Always	Very Competent
2. On leaving or entering port, notify the master/engine room as appropriate and assist in carrying out the master's/ pilot's orders/directions while monitoring the course, speed and position	2.36	Always	Very Competent
3. At the commencement of the watch, ascertain ship position, course and speed and appraise the traffic situation and any hazard to navigation	2.49	Always	Very Competent
4. At sea, prioritize the lookout, fix the ship's position regularly, assess risks of collision and or grounding and take appropriate action	2.47	Always	Very Competent
5. Adjust the ship's course and speed to the traffic, the waters and the meteorological conditions	2.47	Always	Very Competent
6. Monitor and control navigational instruments and record relevant activities and incidents	2.47	Always	Very Competent
Overall Mean	**2.47**	**Always**	**Very Competent**

As shown in Table 3, maintaining a safe navigational watch is a competency encompassing mostly the

duties and responsibilities of an officer on how he or she follows the established bridge management safety procedures when the ship is about to sail, while on the way, and when scheduled to arrive at a particular port.

Table 3 reveals that despite the limited transit time of the offshore vessels, the officers working on these vessels still follow the standard safety procedure as indicated by the results, of which all the tasks were rated by the cadets as always performed.

This result is because the routes of these vessels are within the coastal area. The presence of heavy traffic, state statutory and regulatory rules, and other obstacles cannot be discounted. So as far as the safety of the vessel is concerned, the officers will always follow the standard procedures.

Neglecting or taking these tasks for granted will ultimately result in a near miss or an accident. Furthermore, on the side of a cadet's learning, not practicing these tasks will give him or her a negative perception that it is okay to overlook procedures. It will also create deficiencies in the desired competencies and may negatively impact his values as a future marine officer. Thus, it is essential to continue doing this procedural safety task even if the transit time is minimal. The purpose is to enhance theoretical knowledge and to be able to practice the skill that is very much needed when an officer will be serving onboard a conventional vessel.

The Experiential Learning theory by David Kolb (1984), which promotes learning as the process whereby knowledge is created through experience transformation, supported this finding. The theory provides a holistic model of the learning process and a multi-linear development model, consistent with what we know about how people learn, grow, and develop. It describes the learning undertaken by students who are given a chance to acquire and apply knowledge, skills, and feelings in an immediate and relevant setting. It involves a direct encounter with the phenomena being studied rather than merely thinking about the encounter or considering the possibility of doing something about it.

The constructivism theory of Jerome Bruner (1996) promotes that people construct their understanding and knowledge of the world through experiencing things, and reflecting on those experiences further reinforces the result. So when an individual encounters something new, he or she has to reconcile it with his or her previous ideas and experiences, changing what he or she believes, or maybe discarding the new information as irrelevant.

According to the Situated Learning theory of Lave & Wenger (1990), learning, as it usually occurs, is a function of the activity, context, and culture in which it occurs (i.e., it is situated). Situated learning is a general theory of knowledge acquisition through social interaction. Characterize by critical self-reflection on the learners' experience. It is particularly vital to learners in a professional program where they are expected to actively organize their knowledge framework and apply it to new situations.

In situated learning, it is believed that learning is tied-up in the situation in which the experience occurs and not in the individual. The theory has a particular resonance for adult education because it will show how adult learners discover, shape, and make explicit their knowledge through a community of practice or training. It also allows the individual learner to learn by socialization, visualization, and imitation. In many instances, the learners can explore real-life situations to find solutions to problems. They may also gravitate to groups with shared interests. When learners are in these real-life situations, they are compelled to learn.

Respondents' Acquired Deck Function 1 Technical Competencies

Table 4 presents the respondents' competencies using radar and ARPA to maintain the safety of navigation.

Table 4
Respondents' Acquired Deck Function 1 Technical Competencies in Terms of Using Radar and ARPA to Maintain Safety of Navigation

Indicators	Mean (N=32)	Description	Interpretation
1. Carry out operational checks and adjust the equipment to proper performance	2.59	Always	Very Competent
2. Use the equipment to fix the ship's Position	2.83	Always	Very Competent
3. Operate radar and ARPA to detect	2.21	Seldom	Competent

any hazards for groundings, close quarters situation or collision with other ships or objects and determine appropriate avoiding action			
4, Take appropriate action to avoid Accidents	2.67	Always	Very Competent
Overall Mean	**2.58**	**Always**	**Very Competent**

Table 4 presents the respondents' competence in using Radar and ARPA in connection to navigation. The study revealed that 100% of the respondents were able to practice the minimum tasks required to attain competency. However, the description of one task (indicator number 3) is seldom.

Despite the presence of highly advanced electronic navigation equipment in the bridge of an offshore vessel, the nature of their function and the limited transit period or passage will not give a cadet sufficient time and continuous practice to operate radar and ARPA. Thus, as a result, his competency in this area will not possibly meet the required standard.

Competence is strategically crucial in meeting corporate business goals while being a key driver to being more responsive to current and future labor markets. Therefore, the value of adopting a systematic approach based on standards is a clear manifestation of an organization's vision to excel for it becomes a differentiator in its product market. Adopting standards of competence harmonizes the quality of education and training so that the future seafarer's competence becomes uniform and efficient (Douglas, 2009).

Today, maritime education is a continuously going global sector in every aspect of its services, including human resources. Therefore, this demands a dedicated responsibility by the school administration to ensure that education and competence development are also globally oriented and based on a high level of excellence. It is vital that maritime education matches existing knowledge needs and prepares for the future by addressing the need for a broader scope of competencies than the traditional maritime themes.

Respondents' Acquired Deck Function 1 Technical Competencies

Table 5 presents the respondents' competencies in responding to emergencies.

Table 5
Respondents' Acquired Deck Function 1 Technical Competencies in Terms of Responding to Emergencies

Indicators	**Mean** (N=32)	**Description**	**Interpretation**
1. Describe assigned duties laid down in the ship's contingency plans for emergencies	2.94	Always	Very Competent
2. Demonstrate ability to take initial actions in the event of an emergency	2.89	Always	Very Competent
3. Demonstrate ability to act correctly when emergencies arise in port	2.44	Always	Very Competent
Overall Mean	**2.76**	**Always**	**Very Competent**

As shown in Table 5, the respondents' tasks under competency responding to emergencies are all rated always performed and interpreted as very competent. This result is not surprising at all, even without experiencing an actual emergency.

All vessels registered under IMO are required to conduct a regular emergency drill, whether underway or at the port, to enhance the readiness of the officers and crew to respond. So even if the vessel category is support only, it is not exempted from performing the emergency drills.

The regulation requires all vessels to conduct emergency drills on board. Therefore, all crew must be

competent in the basic tasks of responding to emergencies.

Respondents' Acquired Deck Function 1 Technical Competencies

Table 6 presents the respondents' competencies in responding to a distress signal at sea.

Table 6
Respondents' Acquired Deck Function 1 Technical Competencies in Terms of Responding to a Distress Signal at Sea

Indicators	Mean (N=32)	Description	Interpretation
1. Establish the position of your own ship and the unit in distress	2.19	Always	Very Competent
2. Make a preliminary assessment of the situation, suggest actions and inform the master	2.45	Always	Very Competent
3. Record all incidents and actions taken and the master's decision	2.86	Always	Very Competent
Overall Mean	**2.50**	**Always**	**Very Competent**

As shown in Table 6, the respondents' tasks under competency responding to emergencies are all rated as always performed. This result is not surprising even without experiencing an actual distress signal from another ship.

All vessels registered under IMO are required to conduct a normal response to distress signal drill while underway or to enhance the readiness of the officers and crew in responding to the call. So even if the vessel category is support where the transit or travel time is limited, it is not exempted to practice responding to distress communication at sea. As a result, the cadets still experience the realistic learning approach to acquiring the needed competency for this task.

Considering the regulatory requirement to conduct emergency drills on board, all crew must be competent in the basic tasks of responding to distress communication at sea.

Respondents' Acquired Deck Function 1 Technical Competencies

Table 7 presents the respondents' competencies in using IMO standard marine communication phrases and writing and speaking English.

Table 7
Respondents' Acquired Deck Function 1 Technical Competencies in Terms of Using IMO Standard Marine Communication Phrases and Write and Speak English

Indicators	Mean (N=32)	Description	Interpretation
1. Use IMO Standard Marine Communication Phrases	2.33	Always	Very Competent
2. Use English nautical publications and manuals	2.03	Always	Very Competent
3. Fill in standard English nautical	2.92	Always	Very

reports and forms			
4. Communicate with members of the watch in safety related duties	2.23	Always	Very Competent
Overall Mean	**2.36**	**Always**	**Very Competent**

Table 7 reveals that the tasks under competency using IMO standard marine communication phrases and writing and speaking English were rated by the respondents as always performed.

This result is because the majority of Filipinos are good at the English language. Furthermore, it is common practice on board the ship to let the cadet or apprentice read or study manuals, fill in report forms, do some actual ship-to-ship or ship-to-shore communication and assist the duty officer in performing safety checks.

Respondents' Acquired Deck Function 1 Technical Competencies

Table 8 presents the respondents' competencies in transmitting and receiving information by visual signaling.

Table 8
Respondents' Acquired Deck Function 1 Technical Competencies in Terms of Transmitting and Receiving Information by Visual Signaling

Indicators	Mean (N=32)	Description Interpretation	
1. Transmit and receive Morse Code	2.03	Seldom	Competent
2. Use the International Code of Signals to interpret messages given by flags and pennants	2.10	Seldom	Competent
Overall Mean	**2.36**	**Always**	**Very Competent**

With the advent of modern communication technology, Morse codes and the international code of signals are things of the past. The equipment or paraphernalia are still carried onboard the ship as an extreme backup in case modern technical communication devices like VHF and UHF radio transceivers or the GMDSS bog down.

The respondents rated these tasks as seldom performed because they might only have performed the functions of these traditional communication means in a computer-based drill. Of the two, the international code of signals is still applicable, and the most common usage is during daily bunkering operations.

Respondents' Acquired Deck Function 1 Technical Competencies

Table 9 presents the respondents' competencies in maneuvering the ship.

Table 9
Respondents' Acquired Deck Function 1 Technical Competencies in Terms of Maneuvering the Ship

Indicators	Mean (N=32)	Description Interpretation	
1. Use available information as to the ship's turning circles and stopping distances when maneuvering	2.51	Always	Very Competent
2. Demonstrate proper berthing and anchoring procedures	2.82	Always	Very Competent

3. Maneuver to rescue a man overboard	2.86	Always	Very Competent
Overall Mean	**2.73**	**Always**	**Very Competent**

As shown in Table 9, the tasks under competency maneuver the ship are rated by the respondents as performed always. Task number 1 is manageable because all the information needed to perform the task is within the confine of the bridge. Cadets gain experience in task number 2 by assisting the officers during the actual berthing and anchoring of the ship. While task number three is a bit difficult because it will only occur during man overboard drills.

Based on the above explanation, the conclusion will be that if given a chance to demonstrate the competencies, the respondents will declare themselves as having attained the required competence.

Respondents' Acquired Deck Function 1 Technical Competencies

Table 10 summarizes the overall means and corresponding description of respondents' acquired Deck Function 1 Technical competencies.

Table 10
Summary Table of the Respondents' Acquired Deck Function 1 Technical Competencies

Indicators	**Mean** (N=32)	**Description**	**Interpretation**
1. Plan and Conduct a Passage and Determine Position	1.86	Seldom	Competent
2. Maintain a Safe Navigational Watch	2.47	Always	Very Competent
3. Use of Radar and ARPA to Maintain Safety of Navigation	2.58	Always	Very Competent
4. Respond to Emergencies	2.76	Always	Very Competent
5. Respond to a Distress Signal at Sea	2.50	Always	Very Competent
6. Use IMO Standard Marine Communication Phrases and Write and Speak English	2.36	Always	Very Competent
7. Transmit and Receive Information by Visual Signaling	2.07	Seldom	Competent
8. Maneuver the Ship	2.73	Always	Very Competent
Grand Mean	**2.41**	**Always**	**Very Competent**

Table 10 summarizes the respondents' acquired Deck Function 1 technical competencies based on the STCW requirements. The eight minimum navigation competencies have a grand mean of 2.41, of which, according to statistical means, it has a summative description of always and an interpretation of very competent. However, among the eight, two competencies have a description of seldom.

There are nine specific tasks under competency one to be performed sufficiently for a cadet to gain practical knowledge and skills and be considered competent. As indicated in Table 2, there are three specific tasks the respondents confirm they never do onboard. Not being practiced onboard the conventional vessels could lead to a more significant navigational problem. Competency seven has two specific tasks which are not as vital as competence number one but still required by a cadet to learn.

According to Maxwell R. and Kelly D. (2015), It goes without saying that training is important. Training enables the shipping industry to prepare the crew that the sector requires for safe and efficient

operation and maintenance. Competence is strategically essential in meeting corporate business goals while being a key driver to being more responsive to current and future labor markets. Therefore, the value of adopting a systematic approach based on standards is a clear manifestation of an organization's vision to excel for it becomes a differentiator in the product market. Adopting standards of competence harmonizes the quality of education and training so that the future seafarer's competence becomes uniform and efficient (Douglas, 2009).

It cannot be argued that the first level in the employee's development is assessing needs to ascertain if training or any other intervention is needed. Needs assessment shows who needs training and what trainees need to learn, including the tasks they need to be trained plus the knowledge, skill, behavior, or other job requirements (Noe et al., 2005).

For the offshore vessel cadets, the additional competency needs identification is possible by assessing their training record book. This analytical procedure aims at identifying specific training needs for an individual or group of employees so that training can be tailored to their needs. This analysis focuses on individuals and their specific needs concerning skills, knowledge, or attitudes they must develop to perform their assigned task (Halim & Ali, 1988).

Respondents' Recommendations to Enhance Technical Competencies

This section presents the respondents' recommendations to enhance technical competencies to perform better in conventional vessels. Table 11 summarizes the recommendations.

Table 11
Respondents' Recommendations to Enhance Technical Competencies to Perform Better in Conventional Vessels

Recommendations	Frequency	Percent
1. Passage Planning	32	100.00
2. Bridge Watchkeeping Duties	4	12.50
3. Radar and ARPA Operation	1	3.13

Table 11 reveals the respondents' deficiency gap in their acquired technical competencies. One hundred percent recommended that among the eight competencies, passage planning is the most lacking then, followed by maintaining a safe navigational watch and then use of Radar and ARPA operation.

These recommendations suggested that despite acquiring a grand mean of 2.41 and a description of always performed or competent, there are specific areas in navigational competencies that need to be given post enhancement training to cadets of offshore vessels. This recommendation is because the respondents of this study were not able to perform all the needed tasks in order for them to attain the required competency according to the STCW standards.

Based on the recommendations, the respondents feel they do not have sufficient skills yet to prepare and conduct a passage plan. Thus, if they will serve onboard a conventional ship, they might not be able to satisfactorily perform some of their navigational responsibilities in passage planning, bridge watchkeeping, and use of Radar and ARPA. These areas are vital to the ship's safety when transporting goods or people from the port of departure to the port of destination.

Training is the process of acquiring specific skills to perform a job better. It helps people become qualified and proficient in doing some jobs. Dahama (1979) added that the purpose of human resources training is to prepare a person to function willingly and understand his work situation. Individual development focuses on the importance of personal growth and development through learning programs or training activities. Training is the process of teaching, informing, or educating people so that they may become as well qualified as possible to do their job and they become qualified to perform in positions of greater difficulty and responsibility (Van Dersal, 1962; Jucius, 1963).

Abangan (2013) suggested that shipboard training shall aim to ensure that the student performs needed tasks and acquire the necessary competencies required to qualify as an officer-in-charge of a navigational watch. Shipboard training will serve as an avenue for theoretical knowledge and the learned principles applied in real-time situations and circumstances.

Maluya (2006) stressed that theoretical knowledge is not enough, especially for some professional subjects like navigation and seamanship, which require hands-on activities to develop the related equipment skills.

As job responsibilities change, jobs need to change, and processes re-engineered, the skills and abilities required to perform them will also change. Higher Education Institutions need to anticipate these changes and

address them through assessment, training, and retraining.

Therefore, as the producer of future seafaring officers, it is the primary responsibility of the maritime institutions to ensure that the competencies' acquisition is fully complied with and compliant with the standards of the STCW 95' as amended. This action guarantees that the maritime education graduates are equipped with knowledge, understanding, proficiencies, skills, attitudes, and values to qualify and prepare them for assessment and certification as officer-in-charge of a navigational watch on seagoing ships.

Relationship between the Respondents' Profile and Acquired Competencies

This section presents the test of the significance of the relationship between the respondents' profile and their acquired Deck Function 1 technical competencies. Table 12 summarizes the results.

Table 12
Relationship Between the Respondents' Profile and Acquired Deck Function 1 Technical Competencies

VARIABLES		df	Computed Value	Critical Value	Decision	Interpretation
1. Plan and Conduct a Passage and Determine Position concerning:	Age	3	0.803	7.815	Failed to Reject Ho	No Significant Relationship
	Gender	NA	NA	NA	NA	NA
	Type of Offshore Vessel	3	4.473	7.815	Failed to Reject Ho	No Significant Relationship
	Trade Route	7	4.473	14.067	Failed to Reject Ho	No Significant Relationship
2. Maintain a Safe	Age	3	2.201	7.815	Failed to Reject Ho	No Significant Relationship
Navigational Watch concerning:	Gender	NA	NA	NA	NA	NA
	Type of Offshore Vessel	3	11.761	7.815	Reject Ho	**Significantly Related (C = 0.52, Moderate)**
	Trade Route	7	9.536	14.067	Failed to Reject Ho	No Significant Relationship
3. Use of Radar and ARPA to Maintain Safety of Navigation concerning:	Age	3	3.048	7.815	Failed to Reject Ho	No Significant Relationship
	Gender	NA	NA	NA	NA	NA
	Type of Offshore Vessel	3	11.889	7.815	Reject Ho	**Significantly Related (C = 0.52, Moderate)**
	Trade Route	7	9.481	14.067	Failed to Reject Ho	No Significant Relationship
4. Respond to Emergencies concerning:	Age	3	1.659	7.815	Failed to Reject Ho	No Significant Relationship
	Gender	NA	NA	NA	NA	NA
	Type of Offshore Vessel	3	1.778	7.815	Failed to Reject Ho	No Significant Relationship
	Trade Route	7	5.452	14.067	Failed to Reject Ho	No Significant Relationship
5. Respond to a Distress Signal at Sea concerning:	Age	3	1.306	7.815	Failed to Reject Ho	No Significant Relationship
	Gender	NA	NA	NA	NA	NA
	Type of Offshore Vessel	3	9.714	7.815	Reject Ho	**Significantly Related (C=0.48, Moderate)**
	Trade Route	7	6.400	14.067	Failed to Reject Ho	No Significant Relationship
6. Use IMO Standard	Age	3	3.771	7.815	Failed to Reject Ho	No Significant Relationship

Marine Communication Phrases and Write and Speak English concerning:	Gender	NA	NA	NA	NA	NA
	Type of Offshore Vessel	3	12.522	7.815	Reject Ho	**Significantly Related (C=0.53, Moderate)**
	Trade Route	7	6.276	14.067	Failed to Reject Ho	No Significant Relationship
7. Transmit and Receive Information by Visual Signaling concerning:	Age	3	0.987	7.815	Failed to Reject Ho	No Significant Relationship
	Gender	NA	NA	NA	NA	NA
	Type of Offshore Vessel	3	3.310	7.815	Failed to Reject Ho	No Significant Relationship
	Trade Route	7	7.414	14.067	Failed to Reject Ho	No Significant Relationship
8. Maneuver the Ship concerning:	Age	3	1.306	7.815	Failed to Reject Ho	No Significant Relationship
	Gender	NA	NA	NA	NA	NA
	Type of Offshore Vessel	3	8.381	7.815	Reject Ho	**Significantly Related (C=0.46, Moderate)**
	Trade Route	7	3.149	14.067	Failed to Reject Ho	No Significant Relationship

Table 12 presents the following relationship. The study determined no significant relationship between the respondents' acquired technical competencies in maintaining a safe navigational watch and the type of the offshore vessel they boarded and in acquiring the competency to use the Radar and ARPA and the type of the offshore vessel they boarded.

The study also established a significant relationship between the respondents' acquired technical competencies in responding to a distress signal at sea and their profile regarding the type of offshore vessel they boarded. In acquiring the competency to use IMO standard marine communication phrases and write and speak English, the study showed a significant relationship with the respondents' profile regarding the type of offshore vessel they boarded.

Lastly, in acquiring the competency to maneuver the ship, the study revealed a significant relationship between the respondents' profiles regarding the type of offshore vessel they boarded.

The study's findings established the importance of learning through experience as promoted by Kolb's experiential learning theory. Since the shipboard training aims to ensure that the students will be able to perform the needed navigational and other tasks to acquire the required STCW competencies, thus, it follows that the type of ship or vessel is a vital factor. Non-conventional vessels like the offshore may have the mandatory navigational and other equipment; however, because of their functions, the possibility that the structured tasks will not be performed in accordance with the standard or will not be performed at all.

V. CONCLUSION

The success of producing quality seafarers is the primary responsibility of the maritime institute to ensure a globally competitive and STCW '95 (Standards for Training, Certification, and Watchkeeping) - compliant maritime education graduates. Therefore, to ensure that the students will be able to learn the required tasks to acquire the required competencies, it should always be taken into consideration the type of vessels that has the mandatory equipment and appropriate functions to transform theoretical knowledge into actual practice. This conclusion is in accordance with the primary theory used for this study. Kolb's experiential learning promotes learning as the process whereby knowledge is created through the transformation of experience. It is used to describe the learning undertaken by students who are given the chance to acquire and apply knowledge, skills and feelings in an immediate and relevant setting. It also involves a direct encounter with the phenomena being studied rather than merely thinking about the encounter, or only considering the possibility of doing something about it.

VI. RECOMMENDATIONS

The researchers firmly recommend the following actions based on the findings and conclusion of the study;

1. The researchers hope that similar studies can be undertaken to obtain more researched-based ideas regarding the enhancement of the students' acquired; navigational competencies, cargo handling

competencies, and controlling the operations and care of persons to bridge existing gaps to that in the STCW requirements.

2. To adopt a post cadetship enhancement training in navigation program.

REFERENCES

[1] Alderton, T., Bloor, M., Kahveci, E., Lane, T., Sampson, H., Thomas, M., Winchester, N., Wu, B. and Zhao, M. 2004. The global seafarer: living and working conditions in a globalized industry. London: International Labour Office.

[2] Basak, S.K. A framework on the factors affecting to implement maritime education and training system in educational institutions: A review of the literature. Procedia Eng. 2017, 194, 345–350.

[3] Berg, N., Storgård, J. and Lappalainen, J. 2013. The impact of ship crews on maritime safety. Turku, Finland: Publications of the Centre for Maritime Studies, University of Turku. Retrieved June 2022 from http://www.merikotka.fi/cafe/images/stories/Berg_TheImpact OfShipCrewsOnMaritimeSafety.pdf.

[4] Bruner, J. (1996) *The Culture of Education*, Harvard University Press: 79 Gordon Street, Cambridge, MA, USA.

[5] Chauvin, C.; Lardjane, S.; Morel, G.; Clostermann, J.-P.; Langard, B. Human and organizational factors in maritime accidents: Analysis of collisions at sea using the HFACS. Accid. Anal. Prev. 2013, 59, 26–37.

[6] Commission on Higher Education Memorandum Order 70 Series 2017. Section 12A. Retrieved June 2022 from https://ched.gov.ph/wp-content/uploads/2017/10/CMO-70-s-2017.pdf.

[7] Ellabban, O., Abu-Rub, H., and Blaabjerg, F. (2014). Renewable energy resources: Current status, future prospects and their enabling technology. *Renew. Sustain. Energy Rev.* 39, 748–764. DOI: 0.1016/j.rser.2014.07.113.

[8] Dahama, O.P. (1979) *Extension & Rural Welfare*, New Delhi: Ram Parsads and Sons.

[9] Douglas, J. (2009) *Are your Seafarer Competent*?. The International Maritime Human Element Bulletin.

[10] First Oil and Gas Services (2022). Offshore Support vessels. Retrieved June 2022 from http://www.firstoilandgas.com/offshore-support-vessels-osv/.

[11] Halim & Ali (1988) *Administration and Management of Training Programme*, Bangladesh, Journal of Training and Development.

[12] Harati-Mokhtari, A.; Wall, A.; Brooks, P.; Wang, J. Automatic Identification System (AIS): Data reliability and human error implications. J. Navig. 2007, 60, 373–389.

[13] Hellenic Shipping News Worldwide (2021). Challenges of women seafarers in a male-dominated maritime industry. November 3, 2021.Retrieved June 2022 from https://www.hellenicshippingnews.com/challenges-of-women-seafarers-in-a-male- dominated-maritime-industry/.

[14] ILO. 1996. Accident prevention on board ships at sea and in port. Geneva, Switzerland: ILO Publication.

[15] International Convention on Standards of Training, Certification, and Watchkeeping for Seafarers (STCW). 1995 Edition. Retrieved from https://www.imo.org/en/About/ Conventions/Pages/International-Convention-on- Standards-of-Training,-Certification- and-Watchkeeping-for-Seafarers-(STCW).aspx.

[16] Jucius, M. 1963 *Personnel Management* (5th Ed.), Homewood, IL: Richard D. Irvin.

[17] Karan, C. (2019). What are Offshore Vessels?. Retrieved June 2022 from https://www.marine insight.com/types-of-ships/what-are-offshore-vessels/.

[18] Kolb, D. (1984) *Experiential Learning as the Science of Learning and Development*, Prentice-Hall: Englewood Cliffs, NJ, USA.

[19] Lave, J. & Wenger, E. (1990) *Situated Learning: Legitimate Peripheral Participation*, Cambridge UK: Cambridge University Press.

[20] Maxwell, R. and Kelly, D. (2015). Addressing the skills and training shortages in the shipping industry. Institute of Marine Engineering, Science, and Technology Report. Retrieved June 2022 from https://www.imarest.org/reports/895-report-addressing-the-skills-and- training-shortages-in-the-shipping-industry/file.

[21] Mazhari, S. (2018). Competency of Merchant Ship Officers in the Global Shipping Labour Market: A Study of the "Knowing-Doing" Gap. Ph.D. Thesis, Cardiff University. Retrieved June 2022 from https://core.ac.uk/download/pdf/151397721.pdf.

[22] Ocean Shipping and Shipbuilding—OECD. Retrieved June 2022 from https:// www.oecd. org/ ocean/topics/ocean-shipping.

[23] O'Neil, W. A. 2001. The human element in shipping; keynote address. Biennial Symposium of the Seafarers International Research Centre. Cardiff, June 29, 2001.

[24] Pike, K., Broadhurst, E., Zhao, M., Zhang, P., Kuje, A., & Oluoha, N. (2016). The Gender Empowerment and Multi-cultural Crew (GEM) Project Report, 2015-2016, For the ITF Seafarers' Trust. Retrieved June 2022 from https://www.solent.ac.uk/research- innovation-enterprise/documents/gem-full-report.pdf.

[25] Sadorsky, P. (2009). Renewable energy consumption and income in emerging economies. *Energy Policy* 37, 4021–4028. DOI: 0.1016/j.enpol.2009.05.00.

[26] Tusher, H.M.; Sharma, A.; Nazir, S.; Munim, Z.H. Exploring the Current Practices and Future Needs of Marine Engineering Education in Bangladesh. J. Mar. Sci. Eng. 2021, 9, 1085. https://doi.org/10.3390/jmse9101085.

[27] U.S. House of Representatives (2009). Offshore Drilling: Environmental and Commercial Perspectives: Oversight Hearing Before the Committee on Natural Resources. One Hundred Eleventh Congress, Volume 4, February 11, 2009. Retrieved June 2022 from https://play.google.com/store/books/details?id=AU19h3BXtcEC&rdid=book-AU19h3B XtcEC&rdot=1.

[28] Van Dorsal, W.R. (1962) *The Successful Supervisor*, New York: Harper & Row.

[29] Yilanci V, Haouas I, Ozgur O and Sarkodie S.A. (2021) Energy Diversification and Economic Development in Emergent Countries: Evidence From Fourier Function-Driven Bootstrap Panel Causality Test. *Front. Energy Res.* 9:632712. DOI: 10.3389/fenrg.2021.632712.

[30] Abangan, E. Jr. (2013) Structured Shipboard Training of Deck Cadets in Non-conventional Vessels, University of Cebu: Unpublished master's thesis.

[31] Maluya, R. M. (2206) Shipboard Familiarization Program for Navigation 1, University of Cebu: Unpublished master's thesis.