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Operational use of Electronic Chart Display and Information System (ECDIS) Simulator and Equipment by Maritime Cadets

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Abstract *— The study was focused on the extent of training in the operational use of Electronic Chart Display and Information System (ECDIS) simulator and equipment by maritime cadets as perceived by the respondents. The study also aimed to determine if there is a significant difference between the extent of training in the operational use of Electronic Chart Display and Information System (ECDIS) simulator and equipment. Lastly, the study also aimed to determine if there is a significant relationship between the respondent's profile and the extent of training in the operational use of Electronic Chart Display and Information System (ECDIS) simulator and equipment.*

The study was conducted in the University of Cebu Maritime Education and Training Center (UC-METC). Descriptive correlational research design was used. Moreover, the purposive sampling method was chosen by the researcher, following a criteria to determine the respondents qualified to participate in the study. UC-METC BSMT cadets who completed their academic requirement including the ECDIS simulator training experience; and they had their apprenticeship training in local or international vessels. The total number of respondents for the study was 298. The data gathered were treated and validated using the frequency count, percent, weighted mean, t-test, and chi-square.

The research revealed that the majority of the respondents were 22 years old and the gender of the majority of the respondents is male. The extent of training in the operational use of Electronic Chart Display and Information System (ECDIS) simulator in areas automation of chart updates and route planning is in great extent. While the extent of simulator training in the last area which is position fixing and route monitoring is in moderate extent. The extent of training in the operational use of Electronic Chart Display and Information System (ECDIS) equipment in areas automation of chart updates and route planning is in great extent. While the extent of Equipment training in the last area which is position fixing and route monitoring is in moderate extent. The research concluded that the training programs are able to achieve the skills, knowledge, experiences, etc. expected by the respondents in each of the three areas mentioned, while allocating and using the optimal resources. It was discovered that there is no significant difference between the extent of training in the operational use of ECDIS simulator and equipment, affirming the first null hypothesis. Thus, proving that the ECDIS simulator training of University of Cebu Maritime Education and Training Center (UC-METC) is relevant or aligned to onboard training on actual ECDIS equipment. Moreover, it was also discovered that there is no significant relationship between the respondent's profile and the extent of training in the operational use of ECDIS simulator and equipment, affirming the second null hypothesis.

Keywords *— Maritime, ECDIS Simulator, ECDIS Equipment, Descriptive Correlational, Cebu City, Philippines.*

INTRODUCTION

Training programs oriented towards the development of seafarers' skill-based components are vital to the manpower supplied in the maritime industry. As such, incompetent competency-based training programs, such as training in operational use of ECDIS (Electronic Chart Display and Information System), may produce situations that students may proceed without adequate necessary skills in navigation, position-fixing, planning, ship maneuvering, etc. Furthermore, the lack of quantitative data to further complement the perceived extent of training in the operational use of ECDIS simulator and equipment contributes to the distrust of developing a curriculum leaning towards a newer and more modern educational medium. Hence, it affects the instructor's maximum utilization of the advantages presented by simulator training programs. This problem emphasizes the

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need to evaluate the extent of training in operational use of ECDIS simulator and equipment and if they have any significant difference.

Quality simulator training programs enable seafarers to acquire competencies in various maritime operations, such as berthing, navigation, and pilotage, all in a safe and convenient setting. Determining shipboard simulator training's efficiency and effectiveness is vital in ensuring that the institution provides quality training and produces competent, well-trained seafarers. This in the end will ensure the reliability of the program for instructors to fully utilize their advantages in developing students. Also adding to the safety culture of the vessels they are placed onboard. This also aids the administration to make marketing strategies to promote the school based on the findings of this study. In addition, the researcher is an experienced deck officer with a Chief Mate (CM) license and well-equipped in handling ECDIS simulator training for cadets and actual onboard experience in operational use of ECDIS equipment. Therefore, this prompted the researcher to conduct this study in the extent of training in operational use of ECDIS simulator and equipment among the selected areas.

Moreover, the numerous cases of grounding incidents that had happened in the international shipping have brought the training on the operational use of ECDIS in the limelight. According to Nautical Institute (2012) the ECDIS Training needs clarification because ECDIS is a requirement as part of the International Maritime Organization's (IMO) effort to improve navigational safety. In addition, preventing grounding is a vital part in improving navigational safety. Thus, it is vital on the Maritime School's part to identify if the training they are providing to the Maritime cadets in their ECDIS simulator as well as the actual equipment onboard is effective.

The study aimed to determine the extent of training in operational use of ECDIS simulator and equipment through seafarers' lens. This study also aimed to determine if there was a significant difference between the extent of training in operational use of ECDIS simulator and equipment among the three identified areas: automation of chart updates, route planning, and position fixing & route monitoring. This study also aimed to contribute and be expanded further by future studies.

FRAMEWORK

The main theory of this study was Kolb's experiential learning theory (Kolb, 2015) and supported by the Kirkpatrick's evaluation model (Kirkpatrick 1998) and cognitive load theory (Sweller et al. 2011).

This study was anchored on Kolb's experiential learning theory (Kolb, 2015) which states that the dynamic view of effective learning is based on a learning cycle driven by the resolution of the dual dialectics of action/reflection and experience/ abstraction. This theory means that the development of learning is a cycle mainly involving the introduction of new experiences. Likewise, with the implementation of competency-based, fully simulated learning programs, students who undergo simulated working environments can understand and develop new concepts from concrete experiences. Kolb's experiential learning style theory is commonly represented by a four-stage learning cycle, with each stage reinforcing and feeding into the next.

In the context of this study, the ship-handling curriculum design and competency-based components accommodate themselves to understanding simulation training effectiveness by investigating all four of the concepts of Kolb's experiential learning theory. Cadets experience voyage exercises in simulations (concrete experience), receive feedback from instructors and fellow cadets during the simulation exercise (reflective observation). They can then modify existing ideas and comprehend textbook theories (abstract conceptualization), experiment with proposed actions, make the necessary adjustments or corrections during more real-life complex scenarios, final simulation exercises, or apprenticeships (active experimentation) (Dawicki, 2020).

Moreover, the ideal training on the Electronic Chart Display and Information System (ECDIS) simulator while in the University solely focused on the operational use of ECDIS which falls into the active experimentation phase. This phase will inculcate into the cadet's learning the needed skills and knowledge necessary when they are going to have their apprenticeship which already falls into the concrete experience phase.

According to Kirkpatrick (1998), the evaluation model consists of four levels: reaction, learning, behaviors, and results, respectively. The Kirkpatrick Model, designed with four levels of measure, was shown to be a valuable framework to evaluate the effectiveness of educational training courses (Farjad, 2012).

The first level is the reaction, in which the respondents' reactions are understood to determine how they subjectively evaluate the relevance and quality of the training. Evaluation, on this level, measures the satisfaction of the trainees. The second level, learning, can be described as the extent to which the trainees' attitudes change, their knowledge and skills are broadened as an output of the training. The third level evaluates the changes in work behavior or performance. This level commonly involves studying the change in job behavior as a result of the training. Level four evaluation attempts to assess the training with regards to its organizational results (Kirkpatrick, 1998).

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In addition, the evaluation model is a sound guide for the institution in measuring if the training being conducted in the past on the operational use of Electronic Chart Display and Information System (ECDIS) simulator is at par to the training being conducted onboard ship on the ECDIS equipment. Thus, improving the current curriculum if needed to meet the required competency the cadets should acquire.

According to Sweller et al. (2011), cognitive load theory emphasizes cognitive load, which is the amount of data that can be processed by a working memory at a single time. Since a working memory has a limited capacity, Sweller states that overloading it with additional activities that do not contribute directly to learning affects the efficiency of instructional methods negatively. By allocating resources to activities that directly contribute to learning, the limited capacity is used efficiently.

Moreover, poorly constructed materials and busy simulator room environment can lead to the split-attention effect and add to extraneous cognitive load to the students (Sweller et al. 2011). Thus, it is the job of the Maritime instructor to reduce the extraneous cognitive load with the way they execute their lessons.

Additionally, Clark et al. (2006) emphasized that cognitive load theory revolves around the idea that better and faster learning, or both are driven by efficient instructional environments because they make the best use of limited human cognitive capacity. This idea offers practical, proven guidelines to make instruction efficient (Sweller et al. 2011).

Moreover, the university has the capability to meet all the training demands for ECDIS simulator owing to the fact that the university has the technology and the simulators required by the Commission on Higher Education (CHED) and Maritime Industry Authority (MARINA). However, the problem now will root into the capacity of the administration, instructors and assessors to handle it efficiently and effectively thus giving the cadets the learning environment suitable for them at the same time making the instruction efficient (Sweller et al. 2011).

OBJECTIVES

This study aimed to determine the extent of training in operational use of Electronic Chart Display and Information System (ECDIS) simulator and equipment of the cadets in University of Cebu- Maritime Education and Training Center, Cebu City, S.Y. 2021-2022.The results served as basis for a proposed action plan. More specifically, this study looked into the a) profile of the respondents, b) extent of training in operational use of Electronic Chart Display and Information System (ECDIS) simulator, c) extent of training in operational use of Electronic Chart Display and Information System (ECDIS) equipment, d) significant difference between the extent of training in operational use of Electronic Chart Display and Information System (ECDIS) simulator and equipment, e) significant relationship between the profile of the respondents and the extent of training in operational use of Electronic Chart Display and Information System (ECDIS) simulator and equipment along the three identified areas.

RESEARCH DESIGN

The study used a quantitative, descriptive, and correlational research design in determining the extent of training in operational use of Electronic Chart Display and Information System (ECDIS) simulator and equipment of the cadets in University of Cebu- Maritime Education and Training Center. Descriptive correlational studies describe the variables and naturally occurring relationships between and among them, Sausa, VD (2007). This research design allowed the researchers to gain quantifiable data that was necessary in measuring and determining the extent of training in operational use of Electronic Chart Display and Information System (ECDIS) simulator and equipment of the cadets in University of Cebu- Maritime Education and Training Center.

RESEARCH SITE

The study was conducted in the University of Cebu - Maritime Education and Training Center (UC-METC), located at Alumnus, Mambaling, Cebu city. Maritime institutions such as the University of Cebu–Maritime Education and Training Center (UC-METC), provides subject courses and training programs utilizing Electronic Chart Display and Information System (ECDIS) simulators, Full Mission Bridge Simulators (FMBS), Automatic Radar Plotting Aid (ARPA) simulators, and Cargo Handling Simulators (CHS) to most graduates and undergraduates with completed apprenticeship training onboard vessels. (See Appendix C for the Location Map).

The respondents of this study were the 298 Bachelor of Science in Marine Transportation (BSMT) cadets who completed their academic requirements and are currently undergoing apprenticeship. The respondents were chosen using the simple random sampling method under the following criteria: they had completed their academic requirement including the ECDIS simulator training experience; and they had their apprenticeship training in local or international vessels. The number of respondents depended on the number of

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Volume: 06 Issue: 06 November to December 2023 www.ijlesjournal.org

the cadets who graduated in the last full school year which is 1040. Using the sample size calculator by Raosoft, at least 298 respondents were chosen to participate in the study.

INSTRUMENTATION

The researcher used a researcher-made questionnaire to gather data with regards to the extent of training on Operational Use of Electronic Chart Display and Information System (ECDIS) simulator and equipment. Questions were selected corresponding to the objectives of this study. A likert scale questionnaire was used with 4 scales: Strongly Agree, Agree, Disagree, and Strongly Disagree each corresponding to their respective interpretations. The questionnaire was validated by Dr. Jose Pena and then pilot tested using Cronbach's alpha to measure its reliability. The respondents placed checkmarks on the scale that corresponded to their honest observation on each of the statements provided on the questionnaire.

For the purpose of testing the functionality of the instrument for determining the extent of training in the operational use of ECDIS simulator and equipment, pilot testing was conducted with 50 maritime cadets. Questionnaire in google form format were distributed among the pilot tested respondents. The accomplished questionnaires were tallied and tabulated.

The responses to each item of each instrument were analyzed in order to detect the trend of responses and the incidence of non-response. The software used for testing for the reliability of the instrument was Wessa Cronbach's Alpha calculator. The results showed that the internal consistency of the researcher-made instrument is excellent; therefore, the questionnaire was finalized. The results of the pilot testing were included in the computation of the final data, since the respondents had no doubts about the functionality of the researcher-made instrument

RESEARCH ETHICS PROTOCOL

Respondents were invited to complete a questionnaire that was provided via Google Form during their leisure time for this study. The data is kept private, and only the researcher's adviser has access to the questionnaire. The researchers would ask the respondents to reveal or divulge personal information, which they may feel uncomfortable doing so. Respondents were not required to explain reasons for not answering a question or refusing to participate in the survey. Although there would be no immediate and direct benefits to respondents, one of the goals of this research was to expand the body of knowledge in various disciplines. The researchers would not divulge any information about the respondents. Only the researchers would have access to the information on the respondents and their perceptions that would be acquired as part of this study.

RESULTS AND DISCUSSION

This chapter deals with the presentation, analysis and interpretation of data gathered from the respondents of the study.

Profile of the Respondents

This section presents the profile of the respondents in terms of age and gender. Table 1 summarized the results.

Table 1
Profile of the Respondents

Profile	Frequency	Per Cent (%)
Age		
• 21 years old	22	7.38
• 22 years old	176	59.06
• 23 years old	81	27.18
• 24 to 27 years old	19	6.38
Gender		
• Male	283	94.97
• Female	15	5.03

As shown in Table 1, the majority of the respondents are 22 years old with a percentage of 59.06 and the gender of the majority of the respondents is male with a percentage of 94.97.

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Volume: 06 Issue: 06 November to December 2023 www.ijlesjournal.org

Table 2
Extent of Training in Operational Use of Electronic Chart Display and Information System (ECDIS) Simulator in Terms of Automation of Chart Updates

	Indicators	Mean	Description	Interpretation
1.	I was trained in Chart Ordering procedure using the ECDIS Simulator	3.31	Strongly Agree	Great Extent
2.	I was trained in correcting electronic charts up to the latest Notice to Mariners using the ECDIS Simulator	3.27	Strongly Agree	Great Extent
3.	**I was trained in procedures on how to apply Chart updates on the ECDIS Simulator**	**3.26**	**Strongly Agree**	**Great Extent**
4.	**I was trained in navigating on the Chart Directory in ECDIS Simulator**	**3.33**	**Strongly Agree**	**Great Extent**
5.	I was trained in functions and tools for Chart in ECDIS Simulator	3.31	Strongly Agree	Great Extent
	Overall Mean:	***3.30***	***Strongly Agree***	***Great Extent***

As shown in Table 2, it illustrates the extent of training in the operational use of Electronic Chart Display and Information System (ECDIS) simulator in terms of automation of chart updates which has an overall mean of 3.30 interpreted as *great extent*. The statement that has the highest mean is "I was trained in navigating on the chart directory in ECDIS simulator" with 3.33 interpreted as *great extent*. Moreover, the statement that has the lowest mean is "I was trained in procedures on how to apply chart updates on the ECDIS simulator" with 3.26 interpreted as *great extent*.

The data implies that the respondents were trained by the university using the ECDIS simulator on the automation of chart updates in the level beyond the minimum required by the relevant regulations in the maritime education. Moreover, it shows the capacity of the university to provide quality simulator training on the operational use of Electronic Chart Display and Information System (ECDIS) specifically on the areas about the chart updates which is given emphasis because the purpose of this training prepares the cadets in onboard tasks which focus mainly on electronic charts and the use of paper charts are already considered as contingency.

Table 3
Extent of Training in Operational Use of Electronic Chart Display and Information System (ECDIS) Simulator in Terms of Route Planning

	Route Planning	Mean	Description	Interpretation
1.	I was trained in creating and exporting an order list for Charts used in Route Planning using ECDIS Simulator	3.30	Strongly Agree	Great Extent
2.	I was trained in importing the Cell permits to be used in Route planning using ECDIS Simulator	3.27	Strongly Agree	Great Extent
3.	**I was trained in route waypoints creation in the ECDIS Simulator**	**3.34**	**Strongly Agree**	**Great Extent**
4.	**I was trained in Route checking or Route validation of the Route plan created in the ECDIS Simulator**	**3.34**	**Strongly Agree**	**Great Extent**
5.	**I was trained in putting important markings e.g. Parallel Index, No Go Areas, Wheel Over point, and Abort point in the Route Plan in the ECDIS Simulator**	**3.24**	**Agree**	**Moderate Extent**
	Overall Mean:	***3.30***	***Strongly Agree***	***Great Extent***

As shown in Table 3, it illustrates the extent of training in the operational use of Electronic Chart Display and Information System (ECDIS) simulator in terms of route planning which has an overall mean of 3.30 interpreted as *great extent*. The statements that have the highest mean are "I was trained in route checking or route validation of the route plan created in the ECDIS simulator" and " I was trained in route waypoints creation in the ECDIS simulator" both having a mean of 3.34 interpreted as *great extent*. Moreover, the statement that has the lowest mean is "I was trained in putting important markings e.g. parallel index, no go areas, wheel over point, and abort point in the route plan in the ECDIS simulator" with a mean of 3.24 interpreted as *moderate extent*.

The data implies that the university provides the necessary training for the cadets in route planning using ECDIS simulator. However, it is clear that there is a need to improve on the training on putting important markings in the route plan in ECDIS simulator. The reason for this is the limitations of the simulator which sometimes doesn't have all the functions needed to put in markings in the route plan. In addition, there is also a

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Volume: 06 Issue: 06 November to December 2023 www.ijlesjournal.org

tendency for the instructor to skip on this step when it is not stated as a performance criterion in the exercise plan.

Table 4
Extent of Training in Operational Use of Electronic Chart Display and Information System (ECDIS) Simulator in Terms of Position Fixing & Route Monitoring

	Indicators	Mean	Description	Interpretation
1.	**I was trained in Position Fixing method and interval in the ECDIS Simulator**	**3.14**	**Agree**	**Moderate Extent**
2.	I was trained in setting up of safety parameters in the ECDIS Simulator for Route monitoring	3.16	Agree	Moderate Extent
3.	I was trained in alarms, warnings, and cautions interpretation and acknowledgement in ECDIS Simulator for Route monitoring	3.18	Agree	Moderate Extent
4.	**I was trained in setting-up the Chart layers to always see the hazards during Route Monitoring in ECDIS Simulator**	**3.20**	**Agree**	**Moderate Extent**
5.	I was trained in setting-up Day/Night Setting and ENC scaling in Route monitoring to avoid missing crucial information in ECDIS Simulator	3.15	Agree	Moderate Extent
	Overall Mean:	***3.17***	***Agree***	***Moderate Extent***

As shown in Table 4, it illustrates the extent of training in the operational use of Electronic Chart Display and Information System (ECDIS) simulator in terms of position fixing and route monitoring which has an overall mean of 3.17 interpreted as *moderate extent*. The statement that has the highest mean is " I was trained in setting-up the chart layers to always see the hazards during route monitoring in ECDIS simulator" with a mean of 3.20 interpreted as *moderate extent*. Moreover, the statement with lowest mean is "I was trained in position fixing method and interval in the ECDIS simulator" with a mean of 3.14 interpreted as *moderate extent*.

The data implies that the university should focus more on the simulator training for position fixing and route monitoring. Of all the areas mentioned, this is the area which got the lowest mark. This shows the need for improvement in the simulator training for position fixing, setting up of safety parameters, interpretations of alarms, warning and cautions, setting up of day/night functions and ENC scaling, and lastly the setting up of chart layers in the ECDIS. In addition, the university does not lack the facilities to give simulator training for this area, the only factor that could provide improvement is the instruction.

Table 5
Extent of Training in Operational Use of Electronic Chart Display and Information System (ECDIS) Equipment in Terms of Automation of Chart Updates

	Automation of Chart Updates	Mean	Description	Interpretation
1.	I was trained in Chart Ordering procedure using the ECDIS Equipment	3.27	Strongly Agree	Great Extent
2.	**I was trained in correcting the Electronic Chart up to the latest Notice to Mariners using the ECDIS Equipment**	**3.25**	**Agree**	**Moderate Extent**
3.	I was trained in procedures on how to apply Chart updates on the ECDIS Equipment	3.28	Strongly Agree	Great Extent
4.	I was trained in navigating on the Chart Directory in ECDIS Equipment	3.30	Strongly Agree	Great Extent
5.	**I was trained in functions and tools for Chart in ECDIS Equipment**	**3.31**	**Strongly Agree**	**Great Extent**
	Overall Mean:	***3.28***	***Strongly Agree***	***Great Extent***

As shown in Table 5, it illustrates the extent of training in the operational use of Electronic Chart Display and Information System (ECDIS) equipment in terms of automation of chart updates which has an overall mean of 3.28 interpreted as *great extent*. The statement that has the highest mean is "I was trained in functions and tools for chart in ECDIS equipment" with a mean of 3.31 interpreted as *great extent*. Moreover,

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Volume: 06 Issue: 06 November to December 2023 www.ijlesjournal.org

the statement with the lowest mean is "I was trained in correcting the electronic chart up to the latest notice to mariners using the ECDIS equipment" with a mean of 3.25 interpreted as *moderate extent*.

The data implies that the cadets are trained on the automation of chart updates using ECDIS equipment onboard during their apprenticeship which will help to improve their knowledge and skills acquired in different areas of automation of chart updates. In addition, the learnings acquired from using the actual equipment itself will definitely provide answers to their questions when they are still in the university only using the ECDIS simulator.

On the other hand, based on the respondent's response it is clear that they were not exposed as much to the correction of electronic chart to the latest notice to mariners. This is understandable because the process of doing correction of electronic chart is a very sensitive and risky process that with one misstep it could lead to accidents most specifically, grounding due to uncorrected electronic charts. Thus, the second officer will surely not let the cadet practice or do this procedure.

Table 6
Extent of Training in Operational Use of Electronic Chart Display and Information System (ECDIS) Equipment in Terms of Route Planning

Route Planning	Mean	Description	Interpretation
1. I was trained in creating and exporting an order list for Charts used in Route Planning using ECDIS Equipment	3.28	Strongly Agree	Great Extent
2. I was trained in importing the Cell permits to be used in Route planning using ECDIS Equipment	**3.26**	**Strongly Agree**	**Great Extent**
3. I was trained in Route waypoints creation in the ECDIS Equipment	**3.33**	**Strongly Agree**	**Great Extent**
4. I was trained in Route checking or Route validation of the Route plan created in the ECDIS Equipment	3.32	Strongly Agree	Great Extent
5. I was trained in putting important markings e.g. Parallel Index, No Go Areas, Wheel Over point, and Abort point in the Route Plan in the ECDIS Equipment	3.30	Strongly Agree	Great Extent
Overall Mean:	***3.30***	***Strongly Agree***	***Great Extent***

As shown in Table 6, it illustrates the extent of training in the operational use of Electronic Chart Display and Information System (ECDIS) equipment in terms of route planning which has an overall mean of 3.30 interpreted as *great extent*. The statement that has the highest mean is "I was trained in route waypoints creation in the ECDIS equipment" with a mean of 3.33 interpreted as *great extent*. Moreover, the statement that has the lowest mean is "I was trained in importing the cell permits to be used in route planning using ECDIS equipment" with a mean of 3.26 interpreted as *great extent.*

The data implies that while on apprenticeship, the cadets are taught and are exposed to the operational use of ECDIS equipment in route planning. Onboard ships, the exposure to training in route planning is abundant especially if the vessel is traversing a long voyage because there is enough free time for the cadets to go to the bridge and practice and train on the procedure on route planning using the ECDIS equipment without disturbing the Officer of the Watch (OOW).

Table 7
Extent of Training in Operational Use of Electronic Chart Display and Information System (ECDIS) Equipment in Terms of Position Fixing & Route Monitoring

Position Fixing & Route Monitoring	Mean	Description	Interpretation
1. I was trained in Position Fixing method and interval in the ECDIS Equipment	3.18	Agree	Moderate Extent
2. I was trained in setting-up of safety parameters in the ECDIS Equipment for Route monitoring	**3.19**	**Agree**	**Moderate Extent**
3. I was trained in alarms, warnings, and cautions interpretation and acknowledgement in ECDIS Equipment for Route monitoring	3.18	Agree	Moderate Extent
4. I was trained in setting-up the Chart layers to always see the hazards during Route Monitoring in ECDIS Equipment	3.18	Agree	Moderate Extent

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Volume: 06 Issue: 06 November to December 2023 www.ijlesjournal.org

5.	**I was trained in setting-up Day/Night Setting and ENC scaling in Route monitoring to avoid missing crucial information in ECDIS Equipment**	**3.14**	**Agree**	**Moderate Extent**
	Overall Mean:	***3.17***	***Agree***	***Moderate Extent***

As shown in Table 7, it illustrates the extent of training in the operational use of Electronic Chart Display and Information System (ECDIS) equipment in terms of position fixing and route monitoring which has an overall mean of 3.17 interpreted as *moderate extent*. The statement that has the highest mean is "I was trained in setting-up of safety parameters in the ECDIS equipment for route monitoring" with a mean of 3.19 interpreted as *moderate extent*. Moreover, the statement that has the lowest mean is "I was trained in setting-up day/night setting and ENC scaling in route monitoring to avoid missing crucial information in ECDIS equipment" with a mean of 3.14 interpreted as *moderate extent*.

The data implies that the cadets are trained on the position fixing and route monitoring using the ECDIS equipment onboard but not to the extent of their satisfaction. This is because of the fact that the Officer of the Watch (OOW) will practically do all these statements under this area during his duty, not the cadets. So, there is a possibility that the Officer of the Watch (OOW) will just teach the cadets but will not allow them to practice while the vessel is navigating. Moreover, route monitoring requires deep situational awareness and decision making and the Officer of the Watch (OOW) will definitely not let the cadets act on his own in this case.

Table 8
Difference Between the Extent of Training in Operational Use of Electronic Chart Display and Information System (ECDIS) Simulator and Equipment

Time	Mean	Df	t-Stat	t-Crit	Decision on Ho	Interpretation
Automation of Chart Updates						
● Simulator	3.30	297	0.858	1.968	Failed to Reject Ho	Not Significant
● Equipment	3.28					
Route Planning						
● Simulator	3.30	297	0.040	1.968	Failed to Reject Ho	Not Significant
● Equipment	3.30					
Position Fixing & Route Monitoring						
● Simulator	3.17	297	-0.338	1.968	Failed to Reject Ho	Not Significant
● Equipment	3.17					

As shown in Table 8, the first area which is "automation of chart updates" shows that there is no significant difference between the extent of training in simulator and equipment. For the next category which is "route planning," there is also no significant difference between the extent of training in simulator and equipment. Lastly, for the category "position fixing & route monitoring," there is also no significant difference between the extent of training in simulator and equipment.

The data implies that the extent of training in operational use of ECDIS simulator in University of Cebu is at par with the extent of training in actual ECDIS equipment onboard as experienced by the respondents. This shows that before the cadets experienced onboard training they were already prepared in handling actual ECDIS equipment because they were immersed in simulator training prior to their apprenticeship. It is also a testament to the university's drive to provide quality education for aspiring cadets to enable them to experience using ECDIS simulator and thus becoming ready in facing the realms of actual life onboard.

Table 9

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Volume: 06 Issue: 06 November to December 2023 www.ijlesjournal.org

Relationship between the Respondents' Profile and the Extent of Training in Operational Use of Electronic Chart Display and Information System (ECDIS) Simulator

Variables	Df	Computed Chi-Square	Critical Value	Decision on Ho	Interpretation
Using Simulator					
Age in relation to:					
● Automation of Chart Updates	9	11.283	16.919	Failed to Reject Ho	Not Significant
● Route Planning	9	7.499	16.919	Failed to Reject Ho	Not Significant
● Position Fixing & Route Monitoring	9	8.270	16.919	Failed to Reject Ho	Not Significant
Gender in relation to:					
● Automation of Chart Updates	3	3.929	7.815	Failed to Reject Ho	Not Significant
● Route Planning	3	1.980	7.815	Failed to Reject Ho	Not Significant
● Position Fixing & Route Monitoring	3	1.040	7.815	Failed to Reject Ho	Not Significant
●					
Using Equipment					
Age in relation to:					
● Automation of Chart Updates	9	10.27	16.919	Failed to Reject Ho	Not Significant
● Route Planning	9	13.381	16.919	Failed to Reject Ho	Not Significant
● Position Fixing & Route Monitoring	9	8.21	16.919	Failed to Reject Ho	Not Significant
Gender in relation to:					
● Automation of Chart Updates	3	6.001	7.815	Failed to Reject Ho	Not Significant
● Route Planning	3	4.158	7.815	Failed to Reject Ho	Not Significant
● Position Fixing & Route Monitoring	3	1.206	7.815	Failed to Reject Ho	Not Significant

As shown in Table 9, it illustrates that there is no significant relationship between the respondents' age in relation to the extent of training in operational use of ECDIS simulator in three identified areas. In addition, there is also no significant relationship between the respondent's gender in relation to the extent of training in operational use of ECDIS simulator in three identified areas. The same is also true with regards to the extent of training in operational use of ECDIS equipment. There is also no significant relationship between the respondents' age and gender in relation to the extent of training in operational use of ECDIS equipment.

The data implies that the training in ECDIS simulator and equipment does not discriminate in gender and in age. More and more female cadets are getting the attention of shipping companies nowadays because they are already at par with their male peers. It speaks volume, as there are already female captains and chief mates onboard international and domestic ships. With regards to age, it will also not matter how young or how old you are when we talk about the operational use of ECDIS simulator and equipment because no matter how young or old you are you can still learn the different functions, procedures and operations in ECDIS simulator and equipment training.

CONCLUSION

The ECDIS training programs are able to achieve the skills, knowledge, experiences, etc. expected by the respondents in each of the three areas mentioned, while allocating and using the optimal resources. It was discovered that there is no significant difference between the extent of training in the operational use of ECDIS simulator and equipment, affirming the first null hypothesis. Thus, proving that the ECDIS simulator training of University of Cebu-METC is relevant or aligned to onboard training on actual ECDIS equipment. Moreover, it was also discovered that there is no significant relationship between the respondents' profile and the extent of training in the operational use of ECDIS simulator and equipment, affirming the second null hypothesis.

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