The Influence Of Understanding The Collision Regulations (COLREG) 1972 On Competence Of Navigation Supervision Tasks On Ships

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ARTICLE INFO	ABSTRACT
	This research examined the impact of understanding the 1972 Collision Regulations (COLREG) on navigational watch competence on ships. COLREG, established by the International Maritime Organization (IMO), provides essential guidelines to prevent sea accidents, which every crew member must know. Mastery of COLREG is crucial for cadets in Nautical programs, ensuring they perform effectively during Marine Practice and as future officers. This study utilized a quantitative approach, with structured research objectives, subjects, objects, samples, and data sources. Methodology spanned from data collection to analysis. Findings indicated significant direct correlations: understanding of COLREG with navigation watch duty competence (coefficient = 0.201, p < 0.05), application of COLREG rules (coefficient = 0.235, p < 0.05), situation analysis (coefficient = 0.154, p < 0.05), and taking appropriate actions (coefficient = 0.188, p < 0.05). Similarly, cadet performance showed significant correlations with understanding and applying COLREG rules, situation analysis, and taking appropriate actions, with coefficients ranging from 0.078 to 0.174 (all p < 0.05). Additionally, a strong link was found between cadet performance and navigation watch duty competence (coefficient = 0.458, p < 0.05). The results of the study showed that the competence of navigation surveillance tasks on board ships was closely related to the factors of understanding the 1972 colreg regulations. The findings demonstrate that seafarers with a strong grasp of COLREG can more effectively identify navigational priorities and make appropriate decisions and actions in emergency situations.

Keywords: Collision Regulation, watch Duty Navigation, Politeknik Pelayaran Malahayati, Prevention Collision at Sea, Quantitive Research |

1. INTRODUCTION

International regulations, especially COLREG 1972, need to be well understood by maritime sector human resources to enhance the quality and safety of sea navigation (Du et al., 2020). In this era of globalization, increasing competence becomes an urgent need. With a good understanding of COLREG and other international regulations, maritime sector human resources can avoid the possibility of collisions at sea and maintain the safety of all sailing ships (Irwan, 2020) (Convention on the International Regulations for Preventing Collisions at Sea, 1972 (COLREGs), 2019). Enhanced competence can also provide advantages in global competition and improve the quality of services provided by the maritime sector. Therefore, serious attention and investment in improving the competence of human resources in the maritime sector are important for Indonesia to maintain its position as a major player in the global maritime industry.

This research is important to examine the extent to which understanding of COLREG 1972 affects competence in maritime navigation (Abuelenin, 2017; Ivani et al., 2019). In the context of navigation, understanding COLREG 1972 can affect the effectiveness of navigational tasks performed. Therefore, this research will explore the relationship between understanding COLREG 1972 and task quality in the context of maritime navigation. This research is relevant because an understanding of COLREG 1972 forms the basis for actions and decisions taken in navigation. In this context, a good understanding of COLREG 1972 is

essential so that navigational tasks can be carried out accurately and efficiently. Thus, this study will help identify how an understanding of COLREG 1972 influences competency in navigational tasks, which in turn can enhance the quality of maritime navigation.

Although there are many writings discussing the importance of COLREG 1972, there is rarely any empirical research exploring the impact of this regulation's understanding on navigation competence. COLREG 1972, short for Convention on the International Regulations for Preventing Collisions at Sea 1972, is a regulation that governs navigation and prevents collisions at sea (Ivanisevic et al., 2018; Xu et al., 2020). Despite its general recognition, the impact of understanding and implementing this regulation on navigational abilities has not been extensively studied. Therefore, research investigating the correlation between understanding COLREG 1972 and navigational competence is rarely conducted. This indicates a need for further research to deepen our understanding of how an understanding of COLREG 1972 can enhance navigation skills and abilities with better comprehension.

This research aims to address this deficiency by examining the impact of understanding COLREG 1972 on the navigation officers' skills through a quantitative approach (Ivani et al., 2019; Wang et al., 2009). Another objective is to provide new perspectives that are useful in developing maritime policies and educational approaches. To fill this knowledge gap, the research will analyze quantitative data related to the understanding of COLREG 1972 and the competence of navigation officers. The results of the study are expected to provide new insights that are valuable for stakeholders in designing more effective policies and better maritime education practices.

This research is expected to make a significant contribution to the development of maritime training curriculum as a crucial role in enhancing organizational performance and influencing officer retention (Hendriati et al., 2024). And expected to make a significant contribution to the improvement of safety and efficiency in maritime navigation. The main objective of this research is to achieve sustainability in the maritime industry by enhancing understanding and skills in the field of maritim. It is hoped that through this research, maritime training curriculum can be optimized to provide better knowledge for those involved in the maritime industry. Furthermore, it is also anticipated that this research will identify and implement measures to improve safety and efficiency in maritime navigation. This will reduce the risk of accidents and enhance efficiency in the use of maritime resources. Thus, this research will provide significant benefits for sustainable development within marine industries.

Transportation today plays an important role in the economy of the people and nation of Indonesia (Setiawan et al., 2019). Transportation development activities in Indonesia are increasing, this is the impact of economic activities and socio-cultural activities of the community, in terms of transportation, has an important contribution by using ships to connect between islands in moving cargo in the form of goods and people.

Sea transportation is a type of transportation that is currently receiving full attention from the government because it is considered to have a potential value that is quite influential on the development of the economic and social sector in Indonesia, which consists of thousands of islands (Rochwulaningsih et al., 2019; Satria et al., 2018; Sprintall et al., 2014; Suseto et al., 2019). Cooperation between countries in technological and economic exchange includes the export and import of goods, mostly through sea routes because transportation costs are much more affordable than through air transport. With the existence of shipping routes, it will increase the level of trade which refers to economic growth in the maritime transportation sector. To achieve this, of course, it must be balanced with good delivery quality and as effective as possible safety must also be a top priority. The intended security is the safety of the crew, ship and cargo. Security will be achieved when all crew and ship management can apply the safety rules set by IMO (International Maritime Organization). Every maritime country and company that has become a member of the IMO must apply all the rules contained in the COLREG (collision regulation). (Barnes, 2019; Hannaford et al., 2022; Shashithanganee Weerawansa & Hansamali Gunasekara, 2019; Surian, 2019; Wiley & Sons, 2012) An explanation of what should and what should not be done by the entire crew of the ship, including rules on the prevention of collisions at sea is included in the standing order of the company.

One of the safety regulations that has been established by IMO is the 1972 Prevention of Collision at Sea Regulations or internationally known as COLREG. (collision regulation). This regulation is a regulation to prevent accidents at sea that every crew member must know and understand. COLREG 1972 is the main guideline that should be used as the main reference when there is a risk of collision at sea. All guidelines contained in this regulation aim to prevent or minimize vessels from potential hazards.

Performing the duties of a guard officer while the ship is sailing requires concentration, precision, high responsibility in managing the ship, and skills as a good officer in making decisions (Giot et al., 2023; Sharma et al., 2019; Solmaz, M. S. et al., 2020). Therefore, the officer on duty in lieu of the Master, he is fully responsible at all times during his duty hours for the safety of the vessel and complies with the Collision

Regulations 1972 and Regulation II/1 of STCW 1978 as amended in 2010 (Hellena, 2015; Stones, 2017; Tsimplis & Papadas, 2019).

As a professional officer in carrying out his duties, he needs to be supported by reliable navigational data, which data is obtained from governments, agencies, or other parties. This requires the participation of employees themselves in processing existing information such as shipping barriers, magnetic interference, and marine pollution so that the implementation of guard duties can be carried out effectively and efficiently. As for the efficient implementation of surveillance services, the Chief shall ensure that all visual advance warnings are available for the situation at hand, including the presence of ships and signs from land, continuous observation and load of approaching vessels as well as radar observations. and echo sounder periodically.

Researchers realize that the Officer on Duty has an important role in managing the movement of ships when the ship sails to avoid unwanted things, especially the danger of collisions, where recently we often hear about cases that occur in the maritime world, especially regarding ship hits. Especially in the Traffic Separation Scheme (TSS) traffic separation system.

Politeknik Pelayaran Malahayati, which is a Technical Implementation Unit under the Ministry of Transport, Transportation Human Resources Development Agency which has the task of conducting Professional Education, Research, and Community Services in the field of Shipping, has arranged Diploma III Programs in Naval Studies, Ship Engineering Studies and Ship Electrical Systems Studies and Courses. Collision Regulation (Colreg) or Regulations for Preventing Collisions at Sea is one of the competencies that must be mastered by cadets from the Nautical study program to be able to perform Navigation Surveillance Services on ships both while conducting Sea Practice and after graduating from education and becoming officers on board.

From the description above, the author is interested in conducting research related to the effect of learning outcomes in the Regulation of Collision Prevention at Sea competency course. can perform navigation surveillance tasks on board. Therefore, the researchers will conduct a study entitled "The Effect of Understanding the 1972 Collision Regulations (COLREG) 1972 Regarding the Competency of The Navigation Watchkeeping Duty on Board".

2. METHOD

In this study, the researchers used a quantitative research approach. Quantitative research is a type of activity whose specifications are systematic, planned and clearly structured since the beginning of the research design, both with respect to research objectives, research subjects, research objects, data samples, data sources and methodologies (from data collection to data analysis) (Appelbaum et al., 2018; Bhandari, 2022; Chevillet et al., 2014). Quantitative research involves using numerical data to gather knowledge and understanding about a specific subject. It is guided by the principles of positivism and aims to study a defined population or sample, collect data through research instruments, analyze qualitative/statistical data, and test predetermined hypotheses. The main objectives of quantitative research are to validate theories, demonstrate connections between variables, offer statistical descriptions, as well as estimate and forecast results.

This form of research is considered descriptive correlational. Correlation research involves assessing the degree of relationship between two or more variables without altering existing data. It quantitatively describes the association between interval variables and aims to determine whether this relationship is strong, moderate, or weak. Additionally, correlation design techniques seek to explore evidence derived from data collection to ascertain the significance and meaningfulness of relationships between variables. SPSS 23.0 and AMOS Version 23.0 are used for data processing and analysis in testing theories by analyzing paths for each variable (Hasanah et al., 2018; Indarsin & Ali, 2017; Pambreni et al., 2019). In this study there are two types, namely Independent Variables (Independent) and Dependent Variables (They depend). An independent variable is a factor that has an effect on or leads to a change in the dependent variable. In this research, the independent variable is Understanding of Flat Shipping Science Material, referred to as variable X. X1: Understanding Collision Regulations, X2: Applying Collision Regulations, X3: Analyzing Navigation Situation, X4: Taking concrete steps of COLREG. Dependent variables or also called dependent variables, effect variables, affected variables or dependent variables are variables that are influenced or become results, due to the presence of independent variables. The study's dependent variable is the competence of navigation watch duty on board ships, referred to as variable Y. The intervening variable in this research is cadet performance based on the explanation provided above. The conceptual framework for this study can be outlined as follows:
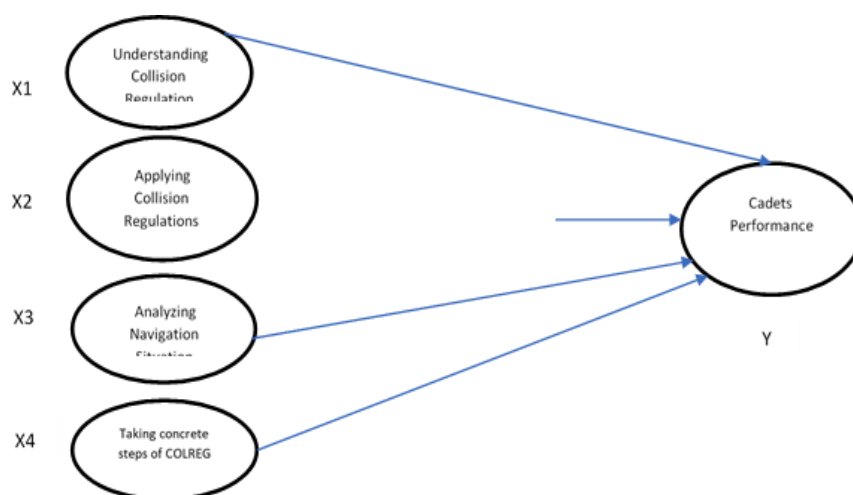
Figure 1. Conceptual Framework

3. RESULTS AND DISCUSSION

Politeknik Pelayaran Malahayati, a professional educational institution in Indonesia situated in Aceh Besar District, Aceh Province, was founded in 2014 and is among the higher education establishments in Aceh that prioritizes maritime education and training. With a focus on diploma III study programs, it aims to equip graduates with competence in maritime and transportation fields to address industry needs within Aceh and its vicinity. The institute boasts comprehensive facilities including naval laboratories, libraries, and cadet dormitories. Moreover, it frequently collaborates with the local maritime industry to ensure alignment between the curriculum taught and industry requirements. Despite being relatively new, Politeknik Pelayaran Malahayati has seen its graduates successfully integrated into the maritime sector while continuously striving for enhancements in their education quality.

In this research, respondent characteristics refer to the attributes and characteristics of individuals who are the subjects of the study or who provide responses to surveys or interviews conducted. The characteristics of respondents in this study are cadets who are currently undergoing navigation practices on board a ship, as described in table 1 below:

Table 1. Age characteristics of cadets

No.	Description	Frequency	Percentage
1.	Age		
	▪ 18 year	4	5,7
	▪ 19 year	21	30,0
	▪ 20 year	29	41,4
	▪ 21 year	13	18,6
	▪ 22 year	3	4,3
Sum		70	100.0

The cadet respondents included in the study fall within the age bracket of 18 to 22 years, encapsulating the transitional phase from early adolescence to early adulthood. This period signifies a critical stage marked by notable physical and psychological transformations integral to their overall growth and development. Recognizing the age-specific characteristics of the respondents is essential as age plays a pivotal role in shaping their perspectives, attitudes, and behaviors. In the span from early teenage to early young adult years, cadets are likely navigating the intricate journey from adolescence to adulthood, grappling with novel challenges, and sculpting their individual identities. These dynamic factors hold significant sway over their responses and active participation in the study, underscoring the importance of considering age-related nuances in the research.

3.1 Validity Testing
Validity testing involves assessing the degree to which a measurement instrument or tool accurately measures its intended construct. It gauges the instrument's capacity to yield precise, reliable, and pertinent results aligned with the targeted variable. In research, the validation process is indispensable to verify that the measurement tool effectively captures the intended variable. It guarantees that the questions or items in the instrument align with the conceptualization of the variable and that the instrument is capable of delivering valid outcomes. The findings from the validity testing of the instrument in this study are outlined below:

Table 2. Results of Validity Testing

No. Statement		Variable	Correlation coefficient	Critical Value 5% (N=70)	Remarks
1.	A1	Understanding COLREG (X₁)	0,930	0,235	Valid
2.	A2		0,932		
3.	A3		0,956		
4.	A4		0,924		
5.	B1	Applying COLREG (X₂)	0,892	0,235	Valid
6.	B2		0,900		
7.	B3		0,940		
8.	B4		0,917		
9.	C1	Analyzing Navigation Situations (X₃)	0,911	0,235	Valid
10.	C2		0,910		
11.	C3		0,858		
12.	C4		0,813		
13.	D1	Taking Concrete Steps in Accordance with COLREG (X₄)	0,951	0,235	Valid
14.	D2		0,960		
15.	D3		0,952		
16.	D4		0,931		
17.	E1	Navigation Watch Duty Competence (Y)	0,901	0,235	Valid
18.	E2		0,896		
19.	E3		0,920		
20.	E4		0,924		
21.	F1	Cadet Performance (Z)	0,932	0,235	Valid
22.	F2		0,923		
23.	F3		0,900		
24.	F4		0,868		

Referencing the information presented in Table 2, it can be elucidated that every variable employed in this study has been affirmed as valid. Consequently, all queries incorporated in the research questionnaire are considered valid, providing a solid foundation for subsequent in-depth investigation. The validation of these variables underscores the reliability and appropriateness of the chosen measurement instruments, instilling confidence in the accuracy and legitimacy of the data collected for the study. The confirmed validity assures researchers that the questions effectively measure the intended constructs and are suitable for facilitating more comprehensive and nuanced research analyses. This validation process contributes to the robustness of the study's methodology and enhances the credibility of the findings.

3.2 Reliability Testing

Reliability testing is the process of evaluating the extent to which a measurement instrument or tool can produce consistent and dependable results. Reliability refers to the extent to which the measuring tool can generate stable results unaffected by irrelevant factors. Reliability testing is commonly conducted using reliability coefficients, such as the Cronbach's Alpha coefficient. Cronbach's Alpha coefficient is one of the commonly used methods to test the reliability of instruments consisting of multiple items or questions. This coefficient measures the extent to which items in the instrument are correlated with each other and consistently produce results The Cronbach's Alpha coefficient values range from 0 to 1. The higher the coefficient value, the higher the reliability of the instrument. Generally, a reliability coefficient value is considered sufficient if it is above 0.70. If the reliability coefficient value exceeds 0.80, it can be said that all items in the instrument are reliable, and the instrument consistently has strong reliability. The results are as shown in the table below which shows that the instruments in this study are reliable (Meeker et al., 2022; Ursachi et al., 2015).

Table 3. Reliability of Research Variables (Alpha)

No.	Variable	Average	Total Variable	Alpha Value	Remarks
1.	Understanding COLREG (x1)	3,457	4	0,952	reliable
2.	Applying COLREG (x2)	3,454	4	0,933	reliable
3.	Analyzing Navigation Situations (x3)	3,486	4	0,896	reliable
4.	Taking Concrete Steps in Accordance with COLREG (x4)	3,546	4	0,963	reliable
5.	Navigation Watch Duty Competence (Y)	3,529	4	0,931	reliable
6.	Cadet Performance (Z)	3,529	4	0,927	reliable

Based on the research results, it can be explained that all variables in this study have Cronbach's Alpha values above 0.60, indicating that all variables in this research are considered reliable as they have Cronbach's Alpha values above 0.60.

3.3 Evaluation Of Goodness Of Fit Criteria

Several methods can be employed to examine the model proposed in this study. In Structural Equation Modeling (SEM) analysis, there is no singular statistical test tool designated for assessing or testing hypotheses related to the model. The following are specific fit indices and their corresponding cutoff values utilized to ascertain whether the model can be deemed acceptable or rejected.

Table 4. Goodness of Fit Criteria for Measurement Models

Goodness-of-Fit Index	Cut off Value	Analysis Results	Model Evaluation
Degree of Freedom (DF)	Positif (+)	Positif (+)	Good
x^2 (Chi-Square)	Expected: Small	667,465	Good
Signifikan Probability	≥ 0,05	0,060	Good
CMIN/DF	≤ 2,00	2,649	Good
GFI	≥ 0,90	0,937	Good
AGFI	≥ 0,90	0,949	Good
PGFI	≥ 0,90	0,951	Good
NFI	≥ 0,90	0,979	Good
TLI	≥ 0,90	0,957	Good
CFI	≥ 0,90	0,978	Good
PNFI	0,60 – 0,90	0,740	Good
RMSEA	0,05 – 0,08	0,085	Good

Utilizing the information from Table 4, it can be clarified that the criteria for goodness of fit in the measurement models within the research model are deemed satisfactory, indicating a positive fit that aligns with the predefined standards for evaluating goodness of fit in measurement models.

3.4 Hypothesis Testing

After ensuring the fulfillment of all prerequisites, the examination of hypotheses, as outlined in the preceding chapter, will be executed. The hypothesis testing in this investigation relies on the evaluation of Critical Ratio (CR) values corresponding to the causal relationships derived from the results of the SEM analysis.

3.4.1 Influence Of Understanding COLREG On Navigation Watch Duty Competence On Board

The calculated parameter for assessing the understanding of COLREG comprehension on navigation watch duty competence on board indicates a CR value of 5.556 with a probability of 0.000. The magnitude of the influence of understanding COLREG on navigation watch duty competence is 0.201. Thus, it can be concluded that understanding COLREG for cadets has an impact on improving navigation watch duty competence on board. This indicates that the better the cadets' understanding of COLREG, the more it contributes to the improvement of navigation watch duty competence on board.

3.4.2 Influnce Of Applying Colreg On Navigation Watch Duty Competence On Board

The calculated parameter for assessing the applying COLREG on navigation watch duty competence on board shows a CR value of 4.375 with a probability of 0.000. The magnitude of the influence of applying COLREG on navigation watch duty competence is 0.235. Thus, it can be concluded that the ability of cadets to apply COLREG will affect the competence of navigation watch duty on board. xnavigation situations will affect the competence of navigation watch duty on board.

3.4.3 Influence Of Analyzing Navigation Situations On Navigation Watch Duty Competence On Board

The calculated parameter for assessing the analyzing navigation situations on navigation watch duty competence on board shows a CR value of 3.693 with a probability of 0.000. The magnitude of the influence of analyzing navigation situations on navigation watch duty competence is 0.154. Thus, it can be concluded that the ability to analyze

3.4.4 Influence Of Analyzing Navigation Situations On Navigation Watch Duty Competence On Board

The calculated parameter for assessing the analyzing navigation situations on navigation watch duty competence on board shows a CR value of 3.693 with a probability of 0.000. The magnitude of the influence of analyzing navigation situations on navigation watch duty competence is 0.154. Thus, it can

be concluded that the ability to analyze navigation situations will affect the competence of navigation watch duty on board.

3.4.5 Influence Of Taking Concrete Steps According To Colreg On Navigation Watch Duty Competence On Board

The assessed parameter to examine the impact of implementing specific measures in accordance with COLREG on the competency of navigation watch duty aboard reveals a Critical Ratio (CR) value of 4.309, accompanied by a probability of 0.000. The extent of the influence stemming from implementing specific measures according to COLREG on navigation watch duty competence is calculated at 0.188. Consequently, it can be inferred that the capability of cadets to take concrete steps in line with COLREG significantly influences their competence in performing navigation watch duties aboard the vessel.

3.4.6 Influence Of Understanding Colreg On Cadet Performance

The assessed parameter, aiming to examine the impact of comprehending COLREG on the performance of cadets, reveals a Critical Ratio (CR) value of 5.023, accompanied by a probability of 0.000. In this research, the calculated influence magnitude of understanding COLREG on cadet performance is 0.174. Hence, it can be deduced that the comprehension of COLREG significantly influences the performance of cadets.

3.4.7 The Influence Of Applying Colreg On Cadet Performance

The parameter estimation for testing the influence of implementing COLREG on cadet performance shows a critical ratio (CR) value of 5.146 with a probability of 0.000. In this study, the magnitude of the influence of implementing COLREG on cadet performance is 0.117. Therefore, it can be concluded that the ability of cadets to implement COLREG will affect their performance.

3.4.8 The Influence Of Analyzing Sailing Situations On Cadet Performance

The parameter estimation for testing the influence of analyzing sailing situations on cadet performance shows a critical ratio (CR) value of 5.055 with a probability of 0.000. In this study, the magnitude of the influence of analyzing sailing situations on cadet performance is 0.078. Therefore, it can be concluded that the ability of cadets to analyze sailing situations will affect their performance.

3.4.9 The Influence Of Taking Concrete Steps According To Colreg On Cadet Performance

The parameter estimation, intended to assess the impact of executing specific measures in accordance with COLREG on cadet performance, discloses a critical ratio (CR) value of 5.296, along with a probability of 0.000. In the context of this investigation, the calculated influence magnitude of cadets' proficiency in implementing concrete steps as per COLREG on their performance amounts to 0.138. Consequently, it can be inferred that the capability of cadets to execute specific measures in accordance with COLREG significantly influences their overall performance.

3.4.10 The Influence Of Navigation Watch Duty Competence On Shipboard On Cadet Performance

The parameter estimation for testing the influence of navigation watch competence on cadet performance shows a critical ratio (CR) value of 5.013 with a probability of 0.000. In this study, the magnitude of the influence of Navigation Watch Competence on cadet performance is 0.458. Therefore, it can be concluded that Navigation Watch Competence on board will affect cadet performance. The results of this study imply that the higher the level of Navigation Watch Competence possessed by cadets, the greater the influence on improving their performance.

3.4.11 The Influence of Understanding COLREG Regulations, Applying COLREG Regulations, Analyzing Sailing Situations, and Taking Concrete Steps in Accordance with COLREG Regulations on Cadet Performance Through Navigation Watch Duty Competence on Board

The research findings conclusively demonstrate that there is an impact exerted by the comprehension of COLREG regulations, the execution of COLREG regulations, the analysis of sailing situations, and the implementation of concrete measures in line with COLREG regulations on cadet performance, as mediated by Navigation Watch Competence aboard. This correlation is visually represented in the illustrated Figure 2 below:
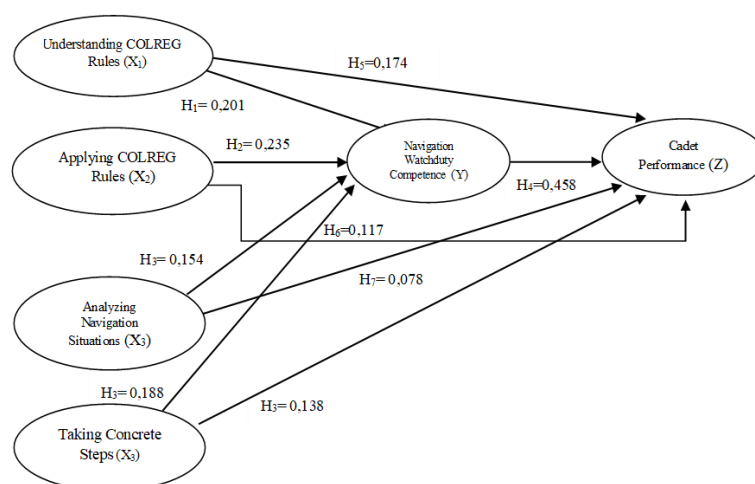
Figure 2. Influence of Inter-Variable in Flow Diagram

Derived from the coefficient outcomes of structural equation modeling, there are discernible influences, both direct and indirect, elucidated comprehensively in Table 6. The results unveil a comprehensive understanding of the interplay between variables, showcasing the intricate network of relationships that contribute to the observed influences. This nuanced analysis provides a detailed insight into the multifaceted impact of the examined factors on the overall model, offering a robust foundation for further interpretation and discussion.

Table 6. Direct and Indirect Influences

No	Description	Direct	Indirect	Total Effect	Remarks
1.	Effect of Understanding COLREG on Cadet's Performance	0,174	0,092	0,266	Direct > Indirect
2.	Effect of Applying COLREG on Cadet's Performance	0,117	0,107	0,224	Direct > Indirect
3.	Effect of Analyzing Navigation situations on Cadet's Performance	0,078	0,070	0,148	Direct > Indirect
4.	Effect of Taking concrete steps according to COLREG on Cadet's Performance	0,138	0,086	0, 224	Direct > Indirect

The direct impact among the studied variables namely X, Y, and Z, encompassing comprehension of COLREG, adherence to COLREG, analysis of sailing situations, implementation of concrete measures in accordance with COLREG, Navigational Duty Competence, and seamen's performance reveals that the direct influence surpasses the indirect influence.

3.4.12 The Influence of Understanding COLREG on Cadet Performance Through Navigation Watch Competence on Board
The direct influence of the variable understanding COLREG on the competence of Navigation Watch Duty on board is 0.174. Meanwhile, the influence of understanding COLREG on the performance of cadets, when mediated by the variable of Navigation Watch Duty competence, is 0.092. This means that to improve cadet performance, it would be better for leadership to directly enhance cadet understanding of COLREG through various activities that can provide knowledge and insight to the cadets, including continuous training.

3.4.13 The Influence of Applying COLREG on Cadet Performance Through Navigation Watch Competence on Board
The direct influence of the variable implementing COLREG on Navigation Watch Duty competence is 0.117. Meanwhile, the influence of implementing COLREG on cadet performance, when mediated by the variable of Navigation Watch Duty competence, is 0.107. This means that to improve cadet performance, it would be better for leadership to provide a better understanding to cadets about the importance of COLREG, especially when they are on duty aboard the ship.

3.4.14 The Influence of Analyzing Navigation Situations on Cadet Performance Through Navigation Watch Competence on Board
The direct impact of analyzing sailing situations on Navigation Watch Duty competence is recorded at 0.078. Simultaneously, the impact of analyzing sailing situations on cadet performance, when mediated through Navigation Watch Duty competence, also stands at 0.070. This suggests that for enhancing cadet performance, it is advisable for leadership to enhance cadets' proficiency in analyzing sailing situations by offering practical sailing experiences in diverse scenarios.

3.4.15 The Influence of Taking Concrete Steps According to COLREG on Cadet Performance Through Navigation Watch Competence on Board

The direct impact of the variable implementing concrete measures in accordance with COLREG on Navigation Watch Duty competence is documented at 0.138. In parallel, the impact of stress associated with implementing concrete measures according to COLREG on cadet performance, when channeled through Navigation Watch Duty competence, is measured at 0.086. This underscores that, for the enhancement of cadet performance, it is advisable for leadership to bolster cadets' capabilities, particularly in executing diverse concrete steps aligned with COLREG. Scheduled training sessions can play a crucial role in equipping cadets with the necessary skills to proficiently carry out specific measures in accordance with COLREG.

4. IMPLICATIONS OF RESEARCH RESULTS

The outcomes of this research carry several implications, suggesting that the comprehension and application of COLREG, along with the analysis of navigation situations and the implementation of specific measures in accordance with COLREG, exert a positive influence on the enhancement of cadet competence. Furthermore, these factors also contribute significantly to the elevation of cadet performance.

Understanding COLREG (Collision Prevention Regulations at Sea) can significantly influence cadet performance through the competence of navigation watch duty on board. Understanding COLREG helps cadets become more aware of collision hazards at sea and the importance of preventing them. They will understand the importance of maintaining a safe distance from other ships, following designated shipping lanes, and adhering to applicable navigation rules. With a good understanding of the dangers of collisions, cadets will be more vigilant and able to take appropriate actions to prevent accidents. Understanding COLREG also assists cadets in developing and improving their competence in navigation watch duty on board. They will better understand their tasks and responsibilities, as well as have deeper knowledge of navigation and applicable rules. With a solid understanding of COLREG, cadets will be able to carry out their duties more effectively and efficiently.

The application of COLREG serves to enhance cadets' awareness regarding potential collision hazards at sea and underscores the importance of preventive measures. Adhering to these regulations fosters an understanding among cadets about the criticality of maintaining a safe distance from other vessels, adhering to designated shipping lanes, and complying with navigation protocols. This heightened awareness of collision risks makes cadets more vigilant, enabling them to take prompt and appropriate actions to avert accidents. The implementation of COLREG also contributes to the development and refinement of cadets' competence in navigation watch duty on board. By applying these regulations, cadets not only gain insights into their tasks and responsibilities but also deepen their knowledge of navigation and relevant regulations. A solid competence in navigation watch duty equips cadets to execute their duties with greater effectiveness and efficiency.

Taking concrete steps according to COLREG helps cadets become more aware of collision hazards at sea and the importance of preventing them. Cadets will understand the significance of maintaining a safe distance from other vessels, following designated shipping lanes, and complying with navigation regulations. With a heightened awareness of the dangers of collisions, cadets will be more vigilant and able to take appropriate actions to prevent accidents. Taking concrete steps according to COLREG also aids cadets in developing and enhancing their competence in navigation watch duty on board. They will gain a better understanding of their tasks and responsibilities, as well as acquire deeper knowledge of navigation and applicable regulations. With solid competence in navigation watch duty, cadets will be able to carry out their duties more effectively and efficiently

To enhance the competence of Navigation Watch Duty, the implementation of specific measures in accordance with COLREG can be employed to aid cadets in the development and refinement of their skills in navigation watch duty aboard the vessel. This entails fostering a more profound comprehension of their duties and responsibilities, deepening their knowledge of navigation, and honing the practical skills necessary for the effective execution of their duties.

5. CONCLUSION

This study significantly contributes to understanding the impact of comprehension of COLREG 1972 regulations on the competence of navigation supervision tasks on ships. Employing a systematic quantitative approach, this research reveals that a profound understanding of COLREG 1972 is positively and significantly linked to enhanced competence in navigation supervision tasks. The findings demonstrate that seafarers with a strong grasp of COLREG can more effectively identify navigational priorities and make appropriate decisions and actions in emergency situations. These insights offer new and valuable perspectives for stakeholders in designing more effective policies and better maritime education practices. The significance of this study lies in its strong methodological approach and comprehensive data analysis, providing a robust foundation for policy recommendations and curricular changes in maritime education. Thus, this research

paves the way for further studies and the development of best practices in maritime education and training, ultimately aiming to improve safety and efficiency in maritime navigation.

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