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Academic Leadership in Fostering Safety Culture in Maritime Educational Institution

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ABSTRACT

Safety is a crucial aspect in the maritime sector due to the high level of risk associated with operational activities in this field. Therefore, maritime educational institutions play a strategic role in instilling safety awareness and behavior among cadets before they enter the workforce in the maritime sector. This study aims to analyze the role of academic leadership in fostering a safety culture within maritime educational institutions. This research employs a quantitative approach with a survey design. Data collection was conducted by distributing questionnaires to fifth-semester cadets majoring in Nautical and Marine Engineering. The total number of respondents in this study was 41. Data analysis was performed using validity tests, reliability tests, and simple linear regression analysis via statistical software. The results indicate that academic leadership has a positive and significant influence on safety culture within maritime educational institutions. The coefficient of determination (R^2) indicates that academic leadership accounts for 41.6% of the variation in safety culture, while the remainder is influenced by other factors outside the scope of this study. These findings suggest that academic leadership plays a crucial role in strengthening safety culture through academic policies, the learning process, and practical activities within the maritime education environment.

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1. INTRODUCTION

Safety is a fundamental aspect in the maritime sector due to the high level of risk associated with operational activities in this field. Various accidents in the maritime sector are often caused by human error, lack of awareness regarding safety procedures, and weak implementation of safety standards in work practices [1], [2]. Therefore, safety improvement efforts are not only conducted at the industrial operational level but also need to start from the education stage through maritime educational institutions. Maritime educational institutions play a strategic role in shaping professional competencies and instilling safety values to students before they directly engage in the workforce [3].

In the context of educational organizations, safety culture is part of organizational culture that reflects values, beliefs, and practices that support the creation of a safe and responsible environment. A strong safety culture can encourage individuals to be more aware of potential risks and comply with safety procedures in every work activity [4], [5]. Previous research shows that organizations with a good safety culture tend to have lower accident rates and are able to create a safer work environment [6]. Therefore, strengthening safety culture

is one of the important factors in improving the quality of both the educational environment and the work environment.

The formation of safety culture within an organization is inseparable from the role of leadership. Leadership has a significant influence in shaping values, norms, and the behavior of organization members [7]. Leaders who are able to provide clear direction, build organizational commitment, and set an example in applying safety values can encourage the formation of a strong safety culture within the organization [8]. In the educational context, leadership is not only related to organizational management but also to the development of quality academic processes.

One form of leadership relevant in educational institutions is academic leadership. Academic leadership relates to the ability of institution leaders in directing academic activities, developing curricula, and creating a learning environment that supports the development of students' competencies [9], [10]. Effective academic leadership can encourage the integration of safety values in the learning process, both through academic policies, practical activities, and student guidance.

2. METHOD

This study uses a quantitative approach with a survey design to analyze the relationship between academic leadership and safety culture in maritime educational institutions. The quantitative approach was chosen because it allows the researcher to measure respondents' perceptions systematically and analyze the relationship between variables statistically.

The research procedure was conducted in stages, including problem formulation, literature study, research instrument preparation, data collection, and data analysis. In the initial stage, the researcher conducted a literature study to identify concepts and indicators related to academic leadership and safety culture. Next, the researcher prepared the research instrument in the form of a questionnaire consisting of a number of statements representing the research variable indicators. After the research instrument was prepared, the questionnaire was then distributed to respondents who met the research criteria.

The population in this study is all cadets who follow the education program at maritime educational institutions in Medan City. Sample determination was conducted using the purposive sampling technique, which is a sampling technique based on specific criteria relevant to the research objectives. The respondent criteria in this study are cadets majoring in Nautical and Marine Engineering who are in the 5th semester, because at that stage cadets have obtained academic learning experiences and practical activities related to the implementation of safety in maritime education. Based on these criteria, the number of samples used in this study was 41 respondents.

The research instrument uses a questionnaire with a five-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). The academic leadership variable is measured through several indicators, namely academic vision, learning process management, educator development, academic supervision, and support for the implementation of safety in learning activities. Meanwhile, the safety culture variable is measured through indicators of safety awareness, compliance with safety procedures, safety communication, risk reporting, and commitment to safety.

Data analysis was conducted using IBM SPSS Statistics software. The data analysis stages include validity testing to determine the level of validity of the research instrument, reliability testing to test the consistency of the research instrument, and simple linear regression analysis to determine the influence of academic leadership on safety culture in maritime educational institutions. Validity testing was conducted by examining the correlation value between each statement item and the total variable score, while reliability testing was conducted using Cronbach's Alpha coefficient to ensure the consistency of the research instrument [13]–[15].

3. RESULTS AND DISCUSSION

3.1. Respondent Characteristics

The respondents in this study were cadets majoring in Nautical and Marine Engineering in the 5th semester at a maritime educational institution. The selection of respondents was based on the consideration that cadets at this semester had already participated in academic activities and practical sessions related to the implementation of safety within the learning process. A total of 41 respondents participated in this study.

Table 1. Respondent Characteristics

Characteristic	Category	Total	Percentage
Major	Nautical	21	51.20%
	Marine Engineering	20	48.80%
Semester	5	41	100%

Based on Table 1, it is known that respondents from the Nautical major numbered 21 (51.2%), while respondents from the Marine Engineering major numbered 20 (48.8%). All respondents were in the 5th semester, thus considered to have sufficient experience in participating in academic activities as well as safety practices in the maritime education environment.

3.2. Validity Test

Validity testing was conducted to determine the extent to which each questionnaire statement item could measure the variables under study. Validity testing was performed using the Pearson Product Moment correlation between the score of each item and the total variable score. A statement item is considered valid if the correlation coefficient value (calculated r) is greater than the critical r value at a 0.05 significance level.

Table 2. Validity test results for the academic leadership variable

Item	calculated r	critical r	Description
X1.1	0.553	0.308	Valid
X1.2	0.653	0.308	Valid
X1.3	0.783	0.308	Valid
X1.4	0.553	0.308	Valid
X1.5	0.46	0.308	Valid
X1.6	0.553	0.308	Valid
X1.7	0.454	0.308	Valid
X1.8	0.555	0.308	Valid

In this study, the number of respondents was 41, resulting in a critical r value (r table) of 0.308. The validity test results (shown by Table 2) showed that all statement items in the academic leadership variable had correlation values ranging from 0.454 to 0.783. All these correlation values were greater than the critical r value (0.308), so it can be concluded that all items in the academic leadership variable are valid and suitable to be used as research instruments.

Furthermore, the validity test results for the safety culture variable (shown by Table 3) indicated that the item-total score correlations ranged from 0.580 to 0.755. All these correlation values were also greater than the critical r value (0.308), thus all statement items in the safety culture variable are declared valid.

Table 3. Validity test results for the safety culture variable

Item	calculated r	critical r	Description
Y1	0.58	0.308	Valid
Y2	0.601	0.308	Valid
Y3	0.755	0.308	Valid
Y4	0.611	0.308	Valid
Y5	0.737	0.308	Valid
Y6	0.636	0.308	Valid
Y7	0.72	0.308	Valid
Y8	0.644	0.308	Valid
Y9	0.684	0.308	Valid
Y10	0.702	0.308	Valid

Therefore, all statement items used in this study have met the validity criteria and can be used to measure the academic leadership and safety culture variables in maritime educational institutions.

3.3 Reliability Test

Reliability testing is conducted to determine the level of consistency of the research instrument in measuring the variables under study. Reliability testing is performed using the Cronbach's Alpha coefficient. A research instrument is declared reliable if the Cronbach's Alpha value is greater than 0.70.

Table 4. Reliability Test Results

Variable	Cronbach's Alpha	Item Total	Description
Academic leadership	0.704	8	Reliable
Safety Culture	0.862	10	Very Reliable

Based on the reliability test results shown in Table 4, it is known that the academic leadership variable has a Cronbach's Alpha value of 0.704 with a total of 8 statement items. This value indicates that the instrument

for the academic leadership variable meets the reliability criteria. Meanwhile, the safety culture variable has a Cronbach's Alpha value of 0.862 with a total of 10 statement items. This value shows that the instrument for the safety culture variable has a very good level of reliability. Therefore, it can be concluded that all research instruments used in this study have a good level of internal consistency and are suitable for further data analysis.

3.4 Simple Linear Regression Analysis

Simple linear regression analysis was conducted to determine the influence of academic leadership on safety culture in maritime educational institutions. The regression analysis results include the model summary, ANOVA test, and regression coefficients.

Table 5. Model Summary Results

Model	R	R square	Adjusted R Square	Std. Error of the Estimate
1	0.645[a]	0.416	0.401	4.03071

a.Predictors: (Constant), Academic leadership

Based on Table 5, the R value is 0.645, indicating a moderately strong relationship between academic leadership and safety culture. The R Square value of 0.416 shows that academic leadership explains 41.6% of the variation in safety culture, while the remaining 58.4% is influenced by other factors outside this study.

Table 6. ANOVA Results

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	451.602	1	451.602	27.797	<0.001[b]
	Residual	633.617	39	16.247		
	Total	1085.220	40			

a. Dependent Variable: Safety culture

b. Predictors: (Constant), Academic leadership

Based on Table 6, the significance value is 0.000 < 0.05, indicating that the regression model used in this study is statistically significant. This means that the academic leadership variable collectively explains the variation in the safety culture variable.

Table 7. Regression Coefficients Results

Model		Unstandardized B	Coefficients Std. Error	Standardized Coefficients Beta	t	Sig
1	(Constant)	11.254	5.176		2.174	0.036
	Academic leadersehip	0.936	0.177	0.645	5.272	<0.001

a.Dependent Variable: Safety culture

Based on Table 7, the regression coefficient for the academic leadership variable is 0.936 with a significance value of 0.000 < 0.05. This indicates that academic leadership has a positive and significant effect on safety culture in maritime educational institutions.

3.5 Discussion

The results of the study indicate that academic leadership has a positive and significant influence on safety culture in maritime educational institutions. This demonstrates that the better the academic leadership practices implemented by institutional leaders, the stronger the safety culture formed within the educational environment. Effective academic leadership can encourage the academic community to understand the importance of safety and comply with the applicable safety standards and procedures in learning activities [16], [17]. In the context of maritime education, the implementation of a safety culture plays a very important role because the learning process is not only conducted in the classroom but also involves various practical activities that carry potential risks, such as laboratory practices, simulators, and safety training activities. Therefore, cadets need to be equipped with safety understanding and awareness from the education phase so they can consistently apply safety procedures when entering the workforce in the maritime sector.

This study's findings show that academic leadership contributes to the formation of safety culture through various academic policies and management of learning activities. Institutional leaders who provide clear direction regarding the importance of safety, supervise the implementation of practical activities, and encourage the application of safety standards in every learning activity can shape safety behavior among cadets. This aligns with field conditions where the success of implementing safety culture in educational environments

is greatly influenced by the commitment of leaders to instill safety values among the entire academic community.

Safety culture in maritime education also plays an essential role in shaping the professional character of cadets [18–20]. The maritime industry is a sector with a relatively high risk of occupational accidents, thus the workforce produced by maritime educational institutions is expected to have high safety awareness and be able to apply safety procedures disciplinarily. With a strong safety culture cultivated starting from the education phase, cadets will be better prepared to face challenges and risks that may occur in the work environment on ships or in other maritime sectors.

The findings also reveal that academic leadership has a considerable contribution to the formation of safety culture, as indicated by the coefficient of determination value of 41.6%. This shows that academic leadership is one of the key factors in building safety culture in maritime educational institutions. Therefore, maritime educational institutions need to strengthen the role of academic leadership in integrating safety values into academic policies, the learning process, and practical activities undertaken by cadets.

4. CONCLUSION

This study aims to analyze the role of academic leadership in fostering a safety culture in maritime educational institutions. Based on the results of the analysis, it was found that academic leadership has a positive and significant influence on safety culture. This indicates that effective academic leadership practices can contribute to shaping safety awareness and behavior within the maritime educational environment.

The study results show that academic leadership is able to explain 41.6% of the variation in safety culture. This finding demonstrates that academic leadership is one of the key factors in building a safety culture within maritime educational institutions [21]–[23]. Through academic policies, supervision of learning activities, and emphasis on applying safety standards in practical activities, institutional leaders play a strategic role in instilling safety values among cadets.

The implementation of safety culture in maritime education is crucial because the learning process not only takes place in classrooms but also involves various practical activities that carry potential risks. Therefore, strengthening academic leadership in maritime educational institutions needs to be continuously conducted so that safety values can be consistently integrated into the learning process and practical activities [24], [25].

This study has limitations as it only examines the influence of academic leadership on safety culture with a limited number of respondents. Therefore, future research can develop the research model by adding other variables that potentially affect safety culture, such as organizational commitment, safety communication, or safety climate within educational institutions. Additionally, future research may be conducted across more maritime educational institutions to obtain a more comprehensive picture of safety culture implementation in maritime education.

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