



The Impacts of Shipboard Training Program on the Competence of Cadets

Andy Wahyu Hermanto^{1*}, M. Imroni Mubin¹, Nerru Pranuta Murnaka², M. Takbir Malliongi³

¹ Politeknik Ilmu Pelayaran, Semarang, Indonesia.

² Science education, Pascasarjana STKIP Surya, Banten, Indonesia.

³ Universitas Islam Negeri Alauddin, Makassar, Indonesia.

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Corresponding Author:

Andy Wahyu Hermanto

andy@pip-semarang.ac.id

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Abstract: Sea practice activities are carried out by cadets of the nautical and engineering study programs in order to improve knowledge and competence in the maritime field. The purpose of this study is to analyze the influence of mentors on cadet competencies, analyze the influence of environmental factors on cadet competencies and analyze the influence of learning motivation on cadet competencies. The method used in this study is quantitative. Respondents are cadets of PIP Semarang semester 7. The number of samples used is 104 people. The survey was conducted with a questionnaire via google form and using a Likert scale. The results of this study are mentors (ship crew, guardian lecturers, mentors) do not have a significant effect on cadet competencies, environmental factors do not have a significant effect on cadet competencies and cadet learning motivation has a significant effect on cadet competencies. So that the relationship between ship crew, mentors and guardian lecturers with cadets and environmental factors during sea practice can be further improved.

Keywords: Advisor; Competence of cadets; Environmental factors; Learning motivation; Shipboard training

Introduction

Indonesia is the largest maritime country and is located in the Southeast Asian region (Pattiradjawane & Soebagio, 2015; Sulistiyono, 2018; Junef, 2019; Rijal, 2019; Rustam, 2020; Mother Earth, 2020; Sobarini, 2021; Ariadno, 2021; Fathiraini et al., 2022; Zen et al., 2022). Indonesia's geographical condition surrounded by sea and coast places Indonesia as one of the archipelagic and maritime countries (Prasetyo et al., 2019; Ruhimat, 2019; Simarmata et al., 2023). The development of the marine world is getting more and more modern era is getting more rapid. This requires every seafarer to have high marine Competence and be able to carry out their duties based on science about maritime technology, seafarers' skills, and science in understanding various kinds of marine regulations (Handojo et al., 2022).

A sailor is required to master knowledge and have skills, namely marine material science and tasks at sea,

and skills in the maritime field, such as using equipment and being able to solve technical problems on board, and must know safety management for safe ship operations (Mawardi et al., 2021). These competencies are needed and must be mastered by cadets who study at shipping schools. If a cadet does not have adequate knowledge and skills, he will experience an accident or unwanted risk and will experience difficulties if there is a technical problem on board (Utomo, 2017; Juwita & Tarigan, 2023). One way to improve the Competence of a seafarer is to undergo practical activities or training that aims to be able to shape the Competence of a seafarer. This experimental activity requires seafarers to apply theories taught in their fields (Widiatmaka et al., 2023).

Semarang Shipping Science Polytechnic (PIP Semarang) is one of the Official Higher Education institutions in Shipping and Ports. One of the programs in PIP Semarang is where students or cadets must carry out sea practices to support knowledge and seek work

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experience that will be faced later. The sea practice in question is a sea project, in the Decree of the Director of the Semarang Shipping Science Polytechnic concerning the Prala Taruna Rules of Conduct article 1 paragraph 3 (2002: 1).

Semarang PIP cadets carry out Marine Practice Activities (Prala) in semesters 5 and 6. The credit load in semesters 5 and 6 is 20 credits/semester. Marine practice activities are carried out within a minimum period of 1 year. Marine practice activities aim to apply the material obtained by cadets during lectures for four semesters (semesters 1 to 4), both in theory and practice. Cadets have received practical learning materials in the Simulator and the Laboratory for four semesters. Functional learning materials related to ship navigation for cadets of the Nautical and Ship Machinery study programs for cadets of the Engineering Study Program. Marine practice is only for cadets of the Nautical and Engineering study programs.

Since the COVID-19 pandemic, many cadet learning activities have been carried out online through e-learning applications that apply at PIP Semarang. Practical learning is done offline during semester 4, hoping to provide knowledge for cadets before carrying out Sea Practice activities. Practical learning activities in laboratories and simulators are carried out in a relatively short period, so the knowledge obtained by cadets is very minimal because not all courses can be carried out offline in practical learning.

Based on the results of initial observations that we made from January to February 2022, several things can be formulated related to the implementation of Marine Practice activities carried out by cadets for the 2021 period, namely; Cadets do not understand basic knowledge related to their scientific fields after carrying out marine practices; Cadets do not receive proper guidance from the crew during sea practice activities; Practical learning carried out on campus has not been maximized, so cadets feel confused when they start carrying out sea practices; and There has been no excellent improvement in Competence of cadets who have completed sea practice.

The research results by Alhadi et al. stated that the relationship between practical work experience and job readiness was low because it did not reach 50%. Student practical work should get more supervision from institutions due to placement in different institutions and sections. At the same time, students' abilities also differ in knowledge and understanding (Alhadi et al., 2022). Other research states that implementing Job Training (OJT) effectively increases students' knowledge and Competence. Effective in improving the Competence of learning outcomes ranging from attitudes and values to general and special abilities (Arumsari et al., 2019).

The goals of this research are grounded in the foregoing context and are as follows: to assess the extent to which the Supervisor influences the competence of Semarang PIP cadets; to assess the extent to which environmental factors influence the competence of Semarang PIP cadets; and to evaluate the impact of learning motivation on the competence of Semarang PIP cadets.

Method

Quantitative research use survey methodologies, like this one. Pinsonneault and Kraemer define survey research as "a strategy for gathering information from a representative sample of a population in order to draw inferences about that population at large" (Fitriyani et al., 2020; Susilawati et al., 2022). The population of this study is all cadets of the Nautical and Technical Study Program of the Polytechnic of Shipping Sciences (PIP) Semarang semester 7 (Sea Practice Post Cadets), with the number of cadets is 137 cadets. The sample in this study was 104 cadets. The Slovin formula is used to count how many parts there are. In 1960, Slovin was the first to publicly present this formula. The number of samples is calculated using the following Slovin formula:

$$n = \frac{N}{(1+N.(e)^2)} \tag{1}$$

Information:

n = Number of Samples

N = Total Number of Population

e = Error Tolerance Limit (Sujarweni, 2014)

Proportional sampling was employed for this analysis. A summary of the sample distribution is shown below.

Table 1. Number of Population and Sample

Class	Number of Cadets	Number of Samples
N 7 A	16	
N 7 B	15	
N 7 C	22	
N 7 D	13	
T 7 A	18	104
T 7 B	18	
T 7 C	17	
T 7 D	18	
Total	137	104

In this investigation, a questionnaire served as the tool. Surveys are used to gather data, and more specifically, Google Forms are used to create questionnaires that can be conveniently accessible by cadets. This research has two main components: the independent variable, which includes the Supervisor,

environmental circumstances, and cadets' willingness to learn, and the dependent variable, which is cadets' actual levels of competence. In order to make the survey available to all cadets, it was created as a Google form (with a Likert scale). The purpose of this Likert-scale survey is to learn how much of an effect Marine Practise has on the competence of Semarang PIP Cadets. The Likert scale is used to assess how people feel about various social issues. Here is the table including the Likert scale (Sugiyono, 2019).

Table 2. Scale Likert (Riduwan, 2015)

Symbol	Information	Score
SS	Totally Agree	
S	Agree	
TS	Disagree	
STS	Strongly Disagree	

After a sufficient quantity of data has been acquired in the field, the next step is analysis. SPSS was used to analyse the data for this investigation.

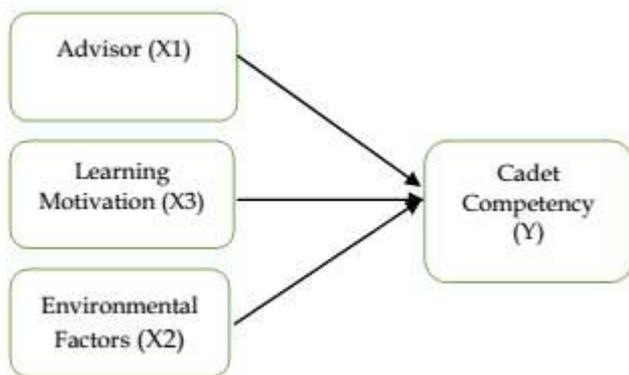


Figure 1. Research variable relationship

The indicators used in this research are: Independent Variables; Supervisor Variable (X1): in this study, the Supervisor is a professional educator and someone who must have the Competence to carry out his responsibilities, entitled to carry out all guidance and counseling activities with the number of students who have been. Supervisors consist of indicators: Ship Crew (X1.1), Guardian Lecturer (X1.2), and Prala Supervisor (X1.3); The X2 variable represents the environmental aspect at hand, namely the workplace setting. The term "work environment" refers to the conditions in which people do their jobs, with the goal of maximising productivity. Ship Environmental Conditions (X2.1), Ship Infrastructure Facilities (X2.2), Relationships between Ship Crew and Cadets (X2.3), and Relationships Between Cadets (X2.4) are all indicators of the quality of the working environment provided by an employer to its employees.; Learning Motivation Variable (X3): in this study, Learning Motivation is Encouragement in students to know to achieve predetermined goals,

namely optimal learning outcomes with indicators: Encouragement to achieve something (X3.1), Commitment (X3.2), Initiative (X3.3), Optimism (X3.4); The independent variables in this study are the Competence of cadets of PIP Semarang Nautical and Technical Study Program indicators: Cognitive Aspects (Y1), Affective Aspects (Y2), and Psychomotroic Aspects (Y3). The study's assumptions are as follows: Supervisors positively impact Semarang PIP cadets' Competence; Environmental Factors adversely affect Semarang PIP cadets' Competence; Learning Motivation positively affects Semarang PIP cadets' Competence.

Result and Discussion

Research Results

The respondents in this study were cadets of the Shipping Science Polytechnic (PIP) Semarang. One hundred four respondents or cadets obtained the object in this study from a population of 137 cadets. Respondents came from 2 Study Programs, namely Nautical and Engineering. As well as coming from the Nursery Pattern (POLBIT), Regular and Independent lines. Respondent data can be seen in the table below:

Table 3. Data Respondents

Study Program	Number of Samples
Nautical	52
Teknika	52
Total	104

Respondents were sampled from September 7 to 12, 2022, through a Google Form questionnaire with 63 question items.

Results of Prerequisite Test or Classic Assumption Test of Respondent Data

Data obtained from respondents will be tested as a prerequisite before the Data Regression Test is carried out. Prerequisite tests are requirements in testing respondent result data, including the Normality Test, Linearity Test, and Data Multicollinearity Test. The results of the prerequisite test are as follows:

Normality Test Results

Table 4 displays the results of an SPSS version 21 normality test on the collected data. Probability or importance is used as the deciding factor. The research data are normally distributed if the likelihood or importance is more significant than 0.05.

Table 4 displays the results of the aforementioned normality test on the data, revealing a residual Kolmogorov-Smirnov value of 2.327. Since the probability or significance value is greater than 0.05, the study data has been uniformly dispersed.

Table 4. Data Normality Test Results

		One-Sample Kolmogorov-Smirnov Test	
		Unstandardized Residual	
N		Mean	104
Normal Parameters, b		Std. Deviation	.0000000
Most Extreme Differences		Absolute	3.32420648
		Positive	.228
		Negative	.155
Kolmogorov-Smirnov Z			-.228
Asymp. Sig. (2-tailed)			2.327
			.000

a Test distribution is Normal; b Calculated from data.

Linearity Test Results

The Linearity Test is performed to ascertain the nature of the connection between the explanatory and response variables. If the value of Sig. linearity is more

than 0.05, then the independent and dependent variables are linearly related. If the value of Sig. linearity is less than 0.05, then the independent and dependent variables do not have a linear relationship.

Table 5. Data Linearity Test Results

		ANOVA Table	Sum of Squares	df	Mean Square	F	Sig.
		(Combined)					
Unstandardized Residual* Unstandardized Predicted Value	Between Groups	Linearity	1100.125	60	18.335	20.715	.000
		Deviation from Linearity	.000	1	.000	.000	1.000
			1100.12	59	18.646	21.066	.000
	Within Groups		38.06	43	.885		
	Total		1138.18	103			

Table 5 displays the results from the linearity test performed on the data in SPSS version 21. Sig. Linearity is known to have a value greater than 0.05, or 1.000. Therefore, the connection between the two sets of data (the independent and dependent ones) may be described as linear.

independent variables are highly correlated with one another, the Multicollinearity Test is performed. Independent variables in a decent regression model should not be correlated with one another (show no signs of multicollinearity). The Tolerance and Variance Inflation Factor (VIF) techniques are among the most reliable approaches to assess multicollinearity. Testing for multicollinearity is based on whether or not the Tolerance value is more than or equal to 0.10. Multicollinearity does not occur if the VIF value is less than 10.00.

Multicollinearity Test Results

In multiple linear regression analysis, the Multicollinearity Test is a portion of the traditional test of assumptions. To ascertain whether or not

Table 6. Data Multicollinearity Test Results

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Coefficients Collinearity Statistics	
	B	Std. Error				Beta	Tolerance
	(Constant)	5.004	2.730		1.833	.070	
Total_X1	.146	.124	.136	1.176	.242	.146	6.830
Total_X2	.101	.133	.108	.760	.449	.198	6.248
Total_X3	.613	.103	.672	5.943	.000	.154	6.500

a. Dependent Variable: Total_Y

Table 6 displays the findings from the multicollinearity test performed on the data in SPSS version 21. Values of the VIF and Tolerance for the Independent Variable (Online Learning and Environmental Factors) are less than or equal to 10.00, respectively. The absence of multicollinearity in the data would then be inferred.

Regression Analysis Results

The following information was compiled using the results of a Multiple Linear Regression analysis performed in SPSS version 21:

Table 7. Regression Results of Variables X1, X2 and X3 Against Y

Model	Variables Entered	Method
	Cadet Learning, Motivation, Mentor, Environmental Factors	Enter

a. Dependent variable: cadet competency; b. All requested variables entered

Table 8. Results of the Determination Coefficient Test

Model	Model Summary			
	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.896a	.803	.797	3.37

a. Predictors: (constant), cadet learning motivation, mentors, environmental factors

Table 9. ANOVA Test Results

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	4639.199	3	1546.400	135.865	.000b
Residual	1138.186	100	11.382		
Total	5777.385	103			

a. Dependent variable: cadet competency; b. Predictors: (constant), cadet learning motivation, mentors, environmental factors

Table 10. Multiple Linear Regression Analysis

Model	Unstandardized Coefficients		Standardized Coefficients		
	B	Std. Error	Beta	t	Sig.
(Constant)	5.004	2.730		1.833	.070
Supervisor	.146	.124	.136	1.176	.242
Environmental Factors	.101	.133	.108	.760	.449
Cadet Learning Motivation	.613	.103	.672	5.943	.000

a. Dependent variable: cadet competency

The following steps can follow the interpretation of the output reading for the hypothesis test process: Regression Model; $Y = \beta_0 + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \epsilon$, form a linear model test hypothesis: $H_0: \beta = (\beta_1, \beta_2, \beta_3) = 0$ (There is no correlation between X1, X2, X3, and Y, hence the equation cannot be linear). $H_1: \beta = (\beta_1, \beta_2, \beta_3) \neq 0$ (linear equation or a set of relations between X, Y, and X1, X2, and Y).

Design Formulation Analysis

Estimator for the linear model, $y = a + bx_1 + cx_2 + dx_3$, two-tailed 5% significance. Coefficients of outputs are read using regression equations based on samples. Constant, Supervising Officer (X1), External Factors (X2), Learning Motivation (X3), and Competence (Y) are the variables that make up the Unstandardized Coefficient B. The results were: $a = 5.004$, $b = 0.146$, $c = 0.101$, and $d = 0.613$. As a result, the regression equation looks like this: $y = 5.004 + (0.146) X_1 + (0.101) X_2 + (0.613) X_3$. We'll put a, b, c, and d through their paces. The F distribution calculation table or the ANOVA output table will tell you whether or not your hypothesis was supported. The resultant value F was 135.865 (Sig = 0.000). Since SPSS automatically handles highly significant data, a comparison with Table F is not required.

Analysis Results

Reject H1 and accept H0 if Sig = 0.000 = 0% 5%. Because of this, we may conclude that X1, X2, and X3 all

have a positive influence on Y, or that the equation is linear. As a result, the study may go on to the next step of determining the size of the effect by calculating the R2 value.

Interpretation of Results

The result of the summary model yielded R square or $R^2 = 0.803 = 80.3\%$, which may be interpreted as the coefficient of determination. This score indicates that the Supervisor (X1), Environmental Factors (X2), and Learning Motivation (X3) can explain 80.3% of the variance in the Y variable, which is Cadet Competency. In other words, the sum of the effects of X1, X2, and X3 on Y is 0.83, or 80.3%. Other than Supervisors, Environmental Factors, and Cadet Learning Motivation, there are still 19.7 percentage points of variance in variable Y that may be accounted for by other factors. The dependent variable Y may be predicted from the values of the independent variables X1, X2, and X3 if the regression equation $Y = 5.004 + (0.146) X_1 + (0.101) X_2 + (0.613) X_3$ is accepted.

Influence of Supervisors on Cadet Competence

The Hypothesis testing results prove that the Supervisor's influence on the Competence of Cadets is quite strong. The simple regression analysis data shows that the Supervisor variable's influence on Cadet Competence has a significance value of $0.242 > 0.05$. This means that the Instructor does not significantly affect the

Cadet's Competence. Prayitno et al. stated that the Supervisor is the executor of counseling guidance in the school specifically assigned to it (Irmansyah, 2020). Thus, guidance and counseling are not carried out by all teachers or just any teacher. Again, as Yeni Karneli, explained in her book, counselors have skills and expertise in relationships and interpersonal assistance activities (Ramaini, 2012). Through these skills and expertise, counselors will concurrently develop various techniques and methods of assistance that match the needs of their clients.

Research conducted by Arumsari et al. stated that based on data analysis with descriptive statistical methods and paired t-tests, it can be concluded that the implementation of the OJT dual system in all study programs of the Department of Ship Mechanical Engineering is declared effective in improving the Competence of learning outcomes ranging from attitudes and values, general abilities and special abilities. The study program with the highest effectiveness is the D4 Piping Engineering study program, seen from the average percentage increase in all competencies reaching 75% and the smallest standard deviation value (Arumsari et al., 2019).

From several references, both journal articles and literature state that work or marine practices significantly affect cadets' or students' Competence. For the supervisor variable, based on data analysis, it was found that the Supervisor did not have a significant effect on the cadet compatibility. Some factors that cause this include a lack of closeness between the Ship Crew and practical cadets and a lack of communication between supervisors and guardian lecturers with practical cadets. So, it does not support the improvement of cadet competence.

The Influence of Environmental Factors on the Competence of Cadets

The findings of the performed testing of the Hypothesis demonstrate that environmental factors have a significant impact on cadet competence. The results of a simple regression analysis reveal that the variables representing environmental factors have a significant influence on cadet competency ($p = 0.449 > 0.05$). This indicates that the environment has no direct effect on cadets' Competence. Temperature, humidity, ventilation, lighting, noise, cleanliness of the workplace, and sufficiency of tools and equipment are all elements of the work environment that workers may control (Tambunan, 2018; Rahayu & Juhaeti, 2022). A person's work environment may be thought of as anything from the tools he uses to the people with whom he interacts to the physical space in which he does his job (Arnasik & Afriza, 2017; Runtu et al., 2019). While according to

Mardiana, the workplace is where people really get their job done (Sulastri & Uriawan, 2020; Kholilah et al., 2021).

According to research conducted by Alhadi et al., the regression analysis and correlation results showed a relatively solid and significant influence. Still, the relationship between practical work experience and job readiness was low because it did not reach 50%. Student practical work should get more supervision from institutions due to placement in different institutions and sections, while students' abilities also differ in knowledge and understanding (Alhadi et al., 2022). The research and literature results stated that work environment factors do not affect the Competence of cadets. Thus, it can be concluded that the environment on board directly cannot affect the improvement of cadet competence when carrying out sea practices.

The Effect of Learning Motivation on Cadet Competence

The findings of the testing of the hypotheses show that cadet learning motivation significantly affects cadet competence. The results of a simple regression analysis reveal that the variables representing environmental factors have no statistically significant influence on cadet competency ($p = 0.000 > 0.05$). Therefore, the level of cadet competence is strongly related to the cadets' interest in learning. The more the cadet's desire to study, the higher their level of competence will be.

Mc. Donald explains that an individual's level of motivation fluctuates in response to the presence of objectives, with the development of "feeling" marking the transition from an inert state to one of activity (Nurrahmah et al., 2019). Slavin argues that an individual's motive is what ultimately causes them to behave in the ways that they do (Herlianah, 2017). Purwanto defines motivation as "the process by which an individual is induced to exert effortful control over his or her behavior in order to bring about a desired outcome" (Rumhadi, 2017). Sardiman defines motivation as an active driving force, or it may be seen of as a sequence of attempts to create favorable circumstances, so that an individual will desire and be driven to do action (Maulida et al., 2025). Boosting students' interest in and engagement with classroom learning activities requires a healthy dose of motivation (Agee, 2016; Johnson, 2017; Arianti, 2019; Burić & Moè, 2020; Rahman, 2021; Yan et al., 2023).

At a study done by Mujiatun, it was shown that the workers' level of enthusiasm at work had a substantial impact on their Competence at the Regional Office VI of the Medan State Civil Service Agency. Based on the findings of the analyzed data, cadets' desire to study has a major impact on their development of skills. The more the cadets' desire to study, the greater the development of their skills (Mujiatun, 2015).

Conclusion

The outcomes of the preceding chapter's discussion lead us to infer that; Supervisors do not significantly affect the Competence of Cadets. Thus, Ship Crew, Guardian Lecturers, and Prala Supervisors do not directly affect the Competence of Cadets; Environmental factors do not significantly affect the Competence of Cadets. Thus, the elements of the Environmental Conditions of the Ship, Infrastructure Facilities on the Ship, the Relationship between the Ship Crew and Cadets, and the Relationship Between Cadets do not directly affect the Competence of Cadets; Cadet Learning Motivation Has a significant effect on cadet competence. Some Learning Motivation Factors directly affect cadets' Competence, Encouragement to achieve something, commitment, initiative, and optimism. The researcher's suggestions for the institutions studied, namely; the relationship between ship crews, supervisors, and guardian lecturers with cadets during sea practice can be further improved by improving communication and interaction so that it is expected to improve cadet competence; Work environment factors can be improved again, to support the improvement of cadet competence, by improving infrastructure facilities, Ship Crew Relations with Cadets, and Relations Between Cadets; and the motivation to learn cadets can continue to be improved so that it can support the improvement of cadets' competencies.

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Author Contributions

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Conflicts of Interest

The authors declare no conflict of interest.

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