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The Strategy of Monitoring Sea Project To Improve Competence Through Application Based Remote Methods

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Abstract. In the field of education, all aspects of education should align with the goals of national education. Education has a significant impact on human development, especially in the era of globalization, to develop academic skills, students' personalities, and mastery of knowledge and technology in accordance with the needs and developments of the working world. Politeknik Ilmu Pelayaran (PIP) Semarang is a vocational state university in the maritime field that implements a one-year full-time internship program for bachelor's and Diploma-IV degrees. This internship program, also known as sea practice, is carried out by cadets on board ships to apply the lessons they have learned during their maritime studies. During the sea practice, the institution continuously monitors the progress of the cadets from a distance to assess their performance during the internship period. In this era of globalization and digitization, information systems are rapidly developing. The integration of information can be implemented in sea practice to prevent and address the educational and maritime testing issues that often arise at the central, regional, and cadet levels. PIP Semarang provides remote monitoring facilities through an application-based system. The observations have shown that this monitoring method can enhance competence, communication, and problem-solving skills. In further development, the application will be aligned with the digitalization-based education management.

Keywords: Sea practice; OTMon; Satisfaction Index; Cadet Record

INTRODUCTION

Sea practice is part of the learning activities in the Nautical and Engineering Study Program formation training at the Semarang Maritime Science Polytechnic (PIP), which involves sailing on commercial ships with sizes and main propulsion determined based on STCW 1978 regulations. Sea practice is carried out for 2 (two) semesters, namely the 5th and 6th semesters. During the implementation of sea practice, the cadets are equipped with a task in the form of a cadet record book or cadet logbook, which serves as the application of theory to direct practice on the ship. It must be filled out in writing and reported periodically according to the provisions of each educational institution. The progress report of completing the cadet record book by Semarang PIP cadets during sea practice is mandatory to be submitted once every month, and the cadet record book will be examined after the cadets complete their sea practice. In Semarang PIP, it is mandatory for the cadets to pass the cadet record book examination as a requirement to participate in the seafarer competency examination. Additionally, when the cadets complete the sea practice, they will not only be examined on the cadet record book but also on the practical work paper (KKP).

METHODS

In the conducted research, data collection methods were derived from primary and secondary sources. For primary data, direct field observations were made regarding the causes and effects of the events. The data collection methods included interviews, observations, and direct reviews. The data processing technique utilized SPSS, and the calculation methods followed relevant regulations concerning public satisfaction or service users.

RESULTS AND DISCUSSION

Over the past 3 (three) years, the average percentage of cadet graduation in conducting the KKP and cadet record book examinations is 100%. The KKP examination is administered by designated lecturers from PIP Semarang, as assigned in a letter of duty from the Director of PIP Semarang. On the other hand, the cadet record book examination is conducted by

examiners from the Competency Examination Committee. The required passing score for the KKP and cadet record book examinations is 70 for each tested competency. The competencies tested in each respective study program are as follows:

Tabel 1. Competency test subjects for nautical and engineering study programs

No	Study Program	Point	Competency
1	Nautica	a	*Navigation at the operational level*
		b	*Cargo Handling and Stowage at the operational level*
		c	*Controling the operation of the ship and care for persons onboard at the operational level*
2	Technic	a	*Marine engineering at the operational level*
		b	*Electrical, electronic and control engineering at the operational level*
		c	*Maintenance and repair at the operational level*
		d	*Controling the operational of the ship and care for persons on board at the operational level*

Tabel 1 presents the test subjects for the competencies in the Nautical and Engineering study programs that are examined through the KKP and cadet record book. The KKP and cadet record book examinations are conducted through written and oral tests. In the written tests, the KKP and cadet record book submissions will be corrected by assigned lecturers or examiners, while in the oral tests, the examination is conducted through an interview method. The assessment results of the KKP examination will be converted into the student's Grade Point Average (GPA) for the 5th semester, while the cadet record book examination results will contribute to the GPA for the 6th semester. Therefore, these examination results will affect the GPA for the respective semesters.

The process following the completion of sea practice is not limited to the KKP and cadet record book examinations as requirements to enter the 7th semester. The cadets from the Nautical and Engineering study programs will undergo the seafarer competency examination. The seafarer competency examination is a system of assessing the participants' level of competence and proficiency in the maritime profession to obtain a seafarer competency certificate and/or endorsement certificate. For the Nautical and Engineering study program cadets at PIP Semarang, the seafarer competency examination is conducted to obtain a maritime diploma with a level III nautical and engineering expert. There are several subjects examined by the cadets, and a passing score of 70 is required for each subject. The seafarer competency examination for Nautical and Engineering study program cadets is organized by the Competency Examination Committee (PUKP) in region 5 at PIP Semarang. The examination is conducted and directly supervised by the Maritime Competency Testing Council (DPKP). The examination is carried out using a Computer Based Assessment (CBA) system. In the CBA examination, the test is conducted in a specialized seafarer competency examination laboratory owned by PIP Semarang. The average percentage of graduation results for PIP Semarang cadets in the Nautical and Engineering study programs, taken as a whole, in the CBA-based seafarer competency examination is as shown in the following table:

Tabel 2. Percentage of passing the seafarer's proficiency examination

Year	Number of Cadets	Percentage of Graduation
2020 (Batch 54)	166	53.33
2021 (Batch 55)	392	49.37
2022 (Batch 56)	339	52.34

Tabel 2 presents the graduation percentages for the seafarer competency examination conducted by PUKP using the CBA system. The seafarer competency examination is organized to obtain a maritime diploma with a level III nautical and engineering expert qualification. This CBA-based seafarer competency examination is conducted after the cadets have passed the KKP and cadet record book examinations. Once they have successfully completed the KKP, cadet record book, and CBA-based seafarer competency examination, the Nautical and Engineering study program cadets have completed the final stage of their maritime education and training at level III. They then proceed to the 7th and 8th semesters, where they study advanced courses in their respective study

programs and engage in maritime education and training at the level II nautical and engineering expert qualification.

The implementation of sea practice plays a crucial role in allowing cadets to review and directly apply the knowledge they have learned on campus while on board a ship. Sea practice enhances the competencies of cadets by exposing them to real-life field situations related to their studies. Cadets undergoing sea practice are assigned to various shipping companies. The ships where the sea practice takes place follow diverse national and international sailing routes. The implementation of sea practice, as part of the education program in the Nautical and Engineering study programs, presents several challenges as the learning of cadets during sea practice is solely under the guidance of officers on board the ship. During sea practice, cadets do not receive direct lectures from professors on campus. Instead, they are guided through their cadet record book by officers on board the ship. The role of the campus in equipping cadets for sea practice is crucial, as it ensures that cadets are well-prepared to successfully complete the practical training.

Before undergoing sea practice, cadets at PIP Semarang are prepared through various activities such as general lectures, academically-based extracurricular activities including laboratory training, workshops, simulators, guidance on filling out the cadet record book, and more. As part of the institution's role in overseeing, evaluating, and controlling the implementation of sea practice, PIP Semarang conducts monitoring by instructing cadets to report their cadet record book entries every month. Additionally, PIP Semarang organizes meetings with partner companies involved in the sea practice to gather feedback regarding the implementation and ongoing progress of the sea practice.

PIP Semarang continuously evaluates the implementation of sea practice. Various challenges and phenomena often occur during sea practice, such as tardiness of cadets, lack of cadet record book submissions, and others. In response to these challenges, PIP Semarang innovates by developing facilities and infrastructure for monitoring sea practice, known as On Board Training Monitoring (OTMon).

The OTMon application is used to control the implementation of sea practice. The current running OTMon application includes information about the companies and ships where the sea practice takes place, the start date of the sea practice, and the cadet record book submissions report.

The supervision using the OTMon application began in 2022. The implementation of the OTMon application started with the cadets of the 57th batch who commenced their sea practice in July 2022. The limitation of the study is the initial identification of the results of using the OTMon application in the first semester of sea practice. The indicators used for the initial observation in the application's usage are focused on its influence on several aspects, such as competence improvement, communication skills, and problem-solving attitude. To determine these indicators, various observation data were compiled.

Validity and Reliability Testing

According to Sekaran (2006), a measurement scale is considered valid if it does what it is supposed to do and measures what it is intended to measure. To determine whether a questionnaire instrument is valid or not, the corrected item-to-total correlation is used. If the value of the corrected item-to-total correlation for a particular item is greater than 0.30, then that item is considered valid. Conversely, if the value of the corrected item-to-total correlation is less than 0.30, then that item is considered invalid. Items that are deemed invalid are usually excluded or not used for measuring the research variables (Sarwono, 2015).

Reliability in research refers to the extent to which an instrument can be trusted to gather consistent data because it is functioning well. An measurement tool is considered reliable if we consistently obtain the same results from unchanged measurement phenomena conducted at different times. To measure the reliability of an analysis, the Cronbach's alpha coefficient (α) can be used, which is based on the average correlation of item scores in the measurement instrument. To determine the reliability of each variable, namely Competence (X1), Communication (X2), Problem Solving (X3), and Effectiveness of OTMon Application (Y), a minimum Cronbach's alpha of 0.5 is used because the number of items in the instrument used in this study is less than 32.

The testing of validity and reliability is used as a measurement of the validity of research data collection instruments. An instrument is considered valid if it is able to measure what it intends to measure. Furthermore, an instrument is considered reliable if it demonstrates stability or

consistency in measuring the same thing at different times. If the value of r-value $r_{hitung} > r_{tabel}$ in the Product Moment test, then the questionnaire item is considered valid. Conversely, if the value of $r_{hitung} < r_{tabel}$ in the Product Moment test, then the questionnaire item is considered invalid (V. Wiratna Sujarweni, 2014).

The figure illustrates the boundaries of the r-table, which can be used to compare the calculated r-value (rcomputed) with the r-table value (rtabel) to determine the validity of the test. The requirement for reliability testing is that the items are valid. Reliability testing can be conducted using the split-half method, which involves dividing the items of the instrument into two halves and correlating the two halves using the Spearman-Brown formula. In reliability testing, if the Gutman split-half coefficient correlation is >0.60, the research instrument is considered reliable; otherwise, it is considered unreliable.

Validity and Reliability Testing of Competencies (X_1)

In the validity and reliability testing of competency, four survey items were observed for variable Y. The validity and reliability testing of competency is used to determine the validity of the measurement instrument for the competency variable. In this test, the Likert scale method was employed and tested using SPSS version 25. In the validity testing, the corrected item-total correlation is referred to as the r-value. The rtabel value for the product moment correlation is obtained from the statistical rtabel distribution based on the degrees of freedom (df) in the research. The formula for df is n-2. In this particular case, the df is calculated as 20-2 = 18. In the rtabel distribution for n18 at a significance level of 5%, the obtained rtabel value is 0.468.

This implies that all respondents were included and analyzed in the testing. Following the inclusion and analysis of all respondents, the validity test was conducted. The results of the validity test are as follows:

Tabel 3. Item-total statictics competency variable

Item-Total Statistics				
Variabel	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbachs Alpha if Item Deleted
X1.1	12.00	1.684	.715	.783
X1.2	12.05	1.313	.796	.752
X1.3	12.00	1.684	.715	.783
X1.4	11.80	2.168	.546	.856

Table 3 is the item-total statistics of the competency variable. In this testing table, the obtained values of rhitung for each item are greater than the rtabel value, specifically in the corrected item-total correlation. After confirming the validity of all the items through the testing process, the reliability test is conducted. If any item is found to be invalid, the variable cannot undergo the reliability test. Since all items in the validity test of the competency variable are declared valid, the reliability test is performed. The results of the reliability test for the competency variable are presented in the following table:

Tabel 4. Realibility statictics variabel competency

Reliability Statictics			
Cronbach's Alpha	Part 1	Value	.869
		N of Items	2[a]
	Part 2	Value	.729
		N of Items	2[b]
	Total N of Items		4
Correlation Between Forms			.631
Spearman-Brown Coeffficient	Equal Length		.774
	Unequal Length		.774
Guttman Split-Half Coefficient			.750

a. The item are : X1.1, X1.2
b. The item are : X2.3, X1.4

Table 4 is the reliability statistics of the competency variable. The table presents the testing of the competency variable to determine the values of the Guttman Split-Half Coefficient.

Validity and Reliability Testing for Communication (X_2)

In the validity and reliability testing for communication, four survey items were observed for variable Y. The testing of validity and reliability for communication is conducted to determine the validity of the communication variable instrument. In this testing, the Likert scale method is employed and analyzed using SPSS version 25. In accordance with this observation, the degrees of freedom (df) are calculated as 20-2 = 18. In the distribution of the product-moment correlation coefficient table for n18 at a significance level of 5%, the corresponding critical value is found to be 0.468. After all the data was inputted and analyzed, the validity testing was conducted. The results of the validity testing are presented as follows:

Tabel 5. Item-total statictics communications variable

Item-Total Statistics				
Variabel	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbachs Alpha if Item Deleted
X1.1	10.75	4.092	.799	.760
X1.2	10.60	3.516	.799	.770
X1.3	10.30	4.747	.693	.810
X1.4	10.95	5.945	.559	.869

Tabel 5 is the item-total statistics of the communication variable. In this testing table, the rhitung (corrected item-total correlation) values for each item are greater than the rtabel value. After conducting the overall testing of the items, it can be concluded that they are valid. Subsequently, a reliability test is performed. The results of the reliability test for the communication variable are presented in the following table:

Tabel 6. Realibility statictics communications variable

Reliability Statictics			
Cronbach's Alpha	Part 1	Value	.827
		N of Items	2[a]
	Part 2	Value	.443
		N of Items	2[b]
	Total N of Items		4
Correlation Between Forms			.859
Spearman-Brown	Equal Length		.924
Coeffficient	Unequal Length		.924
Guttman Split-Half Coefficient			.865

a. The item are : X2.1, X2.2
b. The item are : X2.3, X2.4

Tabel 6 is the reliability statistics of the communication variable. In this table, the testing of the communication variable is conducted to determine the value of the Guttman Split-Half Coefficient.

Validity and Reliability Testing of Problem Solving (X_3)

In the validity and reliability testing of problem solving, 4 survey items were observed for variable Y. The validity and reliability testing of problem solving is used to determine the validity of the measurement instrument for the problem solving variable. In this testing, the Likert scale method is employed and tested using SPSS version 25. In the validity testing, the corrected item-total correlation is referred to as the rhitung value. The rtabel value for the product moment correlation is obtained from the distribution of rtabel statistics based on the degrees of freedom (df) in the study. The formula for df is n-2. In this particular case, the df is calculated as 20-2 = 18. In the distribution of rtabel values for n=18 at a significance level of 5%, the rtabel value is found to be 0.468.

After conducting the testing for all items, it

can be concluded that they are valid. Following the validation testing, the reliability testing is performed. The results of the reliability testing for the problem solving variable are shown in the following table:

Tabel 7. Realibility statictics variabel problem solving

Reliability Statictics			
Cronbach's Alpha	Part 1	Value	.819
		N of Items	2[a]
	Part 2	Value	.675
		N of Items	2[b]
	Total N of Items		4
Correlation Between Forms			.548
Spearman-Brown Coeffficient	Equal Length		.708
	Unequal Length		.708
Guttman Split-Half Coefficient			.708

a. The item are : X3.1, X3.2
b. The item are : X3.3, X3.4

Table 7 is the reliability statistics of the problem solving variable. In this table, the Guttman Split-Half Coefficient is calculated to determine the reliability of the variable.

Perception Testing of The Application (Satisfaction of OTMon Application Usage)

In the user satisfaction survey, the cadets were given a questionnaire regarding their satisfaction with the application usage, consisting of 4 items. The questionnaire is used as the main basis for determining variable Y, which will be further developed into a questionnaire to determine the formation of variable relationships and user satisfaction levels. The survey results were compiled using the Likert scale method, calculated based on the specified formula in the use of the Likert scale method.

Research Findings

Based on the validity testing results of the competence, communication, and problem-solving variables, the testing results are as presented in the following table:

Tabel 8. Validity testing results of competency variables (X_1)

Validity Testing Results of Competency Variables (X_1)			
Item Analysis	r_{count}	r_{tabel} 5% (18)	Criteria
1	.715	.468	valid
2	.796	.468	valid
3	.715	.468	valid
4	.546	.468	valid

Tabel 9. Validity testing results of communication variables (X_2)

Validity Testing Results of Communication Variables (X_2)			
Item Analysis	r_{hitung}	r_{tabel} 5% (18)	Criteria
1	.799	.468	valid
2	.799	.468	valid
3	.693	.468	valid
4	.559	.468	valid

Tabel 10. Validity testing results of problem solving variables (X_3)

Validity Testing Results of Problem Solving Variables (X_3)			
Item Analysis	r_{count}	r_{tabel} 5% (18)	Criteria
1	.653	.468	valid
2	.649	.468	valid
3	.618	.468	valid
4	.507	.468	valid

Based on the comparison between the calculated value (rhitung) and the critical value (rtabel), it can be concluded that all items for the competence (X1), communication (X2), and problem solving (X3) variables are considered valid. Following the validity testing, a reliability assessment was conducted for each variable. The Gutman split-half coefficients for competence, communication, and problem solving were found to be .750, .865, and .708, respectively, indicating that all variables are reliable.

Furthermore, in the basic research on user satisfaction with the OTMon application among the cadets in the first semester, the cadets gave a

rating of 77.00 or 3.08 on a scale of 4.00 for their satisfaction with using the OTMon application. This analysis suggests that the cadets rated the usage of the OTMon application as "Good."

CONCLUSION

Based on the observations conducted on the effectiveness of using the OTMon application, several conclusions can be drawn from the research. The comparison between the calculated value (rhitung) and the critical value (rtabel) for all items of the competence (X1), communication (X2), and problem solving (X3) variables indicates that they are valid. Additionally, based on the basic observations of user satisfaction with the OTMon application, the cadets gave a rating of 77.00 or 3.08 on a scale of 4.00 for their satisfaction with using the OTMon application. Upon analysis, this indicates that the cadets rated the usage of the OTMon application as "Good." From these conclusions, several suggestions can be formulated. It is recommended for future research to test the correlation and/or regression to further measure the impact of using the OTMon application on the improvement of competence, communication skills, and problem-solving abilities of the cadets. Additionally, it is advisable to conduct evaluations of the OTMon application in the first semester to ensure its continuous usage and monitor its development as a factor for enhancing the aforementioned variables.

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