

Philippine Merchant Marine Academy (PMMA) Shipboard Monitoring System

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Abstract: The main purpose of this study is to customize a Shipboard Monitoring for Philippine Merchant Marine Academy. It also shows an excellent reliability with respect to transmission ratio speed of sensor nodes and a significant connectivity between nodes located in different compartments and decks separated by metallic watertight doors using the shipboard monitoring system, (Kdouh et al., 2013).

Specifically, the study seeks to find answers to the following questions: (1) What is the profile of the respondents in terms of: 1.1. Position; 1.2 Age; and 1.3 Course? (2) How do administrator-respondents perceive the effectiveness of the customized PMMA Shipboard Training Monitoring System in terms of: 2.1. Accuracy; 2.2. Security; and 2.3 Functionality? (3) How do the trainee-respondents perceive the effectiveness of the customized PMMA shipboard Training Monitoring System in terms of: 3.1. User-friendliness; and 3.2. Speed of processing? (4) Is there a significant difference on the respondents' perception on the effectiveness of the customized PMMA Shipboard Training Monitoring System when grouped according to profile variable?

The researcher assumed that the customized PMMA Shipboard Training Monitoring System is *very effective* in terms of *accuracy, security, functionality, user-friendliness* and *speed of processing* as perceived by the administrators and trainees.

Sixty (60) or 90 percent of the respondents are trainees while seven (7) or 10 percent are administrators. The administrator-respondents were composed of four (4) personnel of DST and three (3) academic officials.

It was found and concluded that: (1) A typical trainee-respondent is 23.74 year old BSMarE cadet, (2)

The administrator-respondents perceived the customized PMMA Shipboard Training Monitoring System in terms of accuracy, security, and functionality as very effective, (3) The trainee-respondents perceive the customized PMMA shipboard Training Monitoring System in terms user-friendliness and speed of processing as very effective, (4) Respondents' position and course affects their perception on the effectiveness of the customized PMMA Shipboard training Monitoring System in terms of speed of processing.

Based on the following recommendations: (1) The approval of the use of the customized PMMA Shipboard Training Monitoring System for the trainees of the Philippine Merchant Marine Academy on board, (2) The immediate full implementation of the PMMA Shipboard Training Monitoring System. (3) Further study must be done to improve its features and capabilities like locking of grading sheet, notification code generated, and summation of total months of embarkation, (4) Further monitoring of the system in its implementation.

Keywords: *Shipboard Monitoring, Shipboard Training, System.*

INTRODUCTION

The main purpose of this study is to customize a Shipboard Monitoring for Philippine Merchant Marine Academy. It also shows an excellent reliability with respect to transmission ratio speed of sensor nodes and a significant connectivity between nodes located in different compartments and decks separated by metallic watertight doors using the shipboard monitoring system, (Kdouh et al., 2013).

The customized cloud-based application is a secure and net accessible interactive computing system that

permits user access to grade, reports, assignment, required tasks, sea project report and shipboard training status. This technology could overcome the difficulty of signal transmission in the present shipboard Monitoring system based on GSM and GPRS and could also transfer multi-media information including pictures and sounds, which could be used to judge the working condition of machines on board ship and hence improve the accuracy of remote monitoring and failure diagnosis for river-going ships greatly, (Yi-huai1, Jing1, Yong1, & Juc, 2009) Through this system, trainees were assigned with a singular positive identification. All information to and from the academy were generate using this distinctive symbol. Trainees were able to create his own profile, able to keep posted with PMMA administrator and able to connect with other trainees.

Statement of the Problem

The main objective of the study is to customize the PMMA Shipboard Training Monitoring System in line with the DST requirements. Also, the study was focus to determine the effectiveness of the customized system.

Specifically, the study seeks to find answers to the following questions:

1. What are the profile of the respondents in terms of their:
 - 1.1 Position;
 - 1.2 Age; and
 - 1.3 Course?
2. How do administrator-respondents perceive the effectiveness of the customized PMMA Shipboard Training Monitoring System in terms of:
 - 2.1. Accuracy;
 - 2.2. Security; and
 - 2.3. Functionality?
3. How do the trainee-respondents perceive the effectiveness of the customized PMMA shipboard Training Monitoring System in terms of:
 - 3.1. User-friendliness; and
 - 3.2. Speed of processing?

4. Is there a significant difference on the respondents' perception on the effectiveness of the customized PMMA Shipboard Training Monitoring System when grouped according to profile variable?

Method

Research Locale

The research was conducted at the Philippine Merchant Marine Academy located at San Narciso, Zambales.

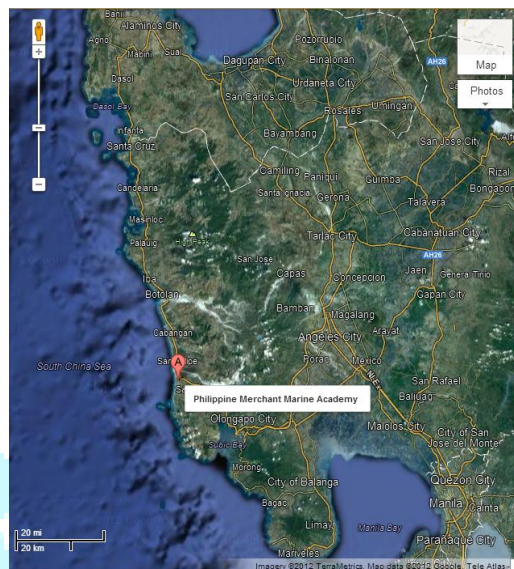


Figure 2. The locale of the study

Sampling Technique

The researcher has used purposive sampling technique. Purposive sampling technique is used to reduce the cost and the amount of work that it would take to survey the entire target population. The researcher focused on particular characteristic, attribute or nature of a certain portion of the population to answer the research questions of the study.

Participants

The respondents of the study were consisted of 1CL Bachelor of Science in Marine Transportation and Bachelor of Science in Marine Engineering of the Academy official enrolled during the pilot testing of the study. Also, the DST staff and personnel served as respondents of the study. Furthermore, the pilot testing

also includes the academic department officials as respondents.

Table 1
Frequency and Percentage data of the Respondents

Respondent	Frequency	Percentage
BSMT	58	45.31
BSMarE	63	49.22
DST	4	3.13
Academic Official	3	2.34
Total	128	100

Table 1 shows the frequency and percentage data of the respondents. Fifty eight (58) or 45.31 percent of the respondents were BSMT while sixty three (63) or 49.22 percent were BSMarE midshipmen/midshipwomen; four (4) or 3.13 percent were DST staff/personnel and three (3) or 2.34 percent were academic officials. The total number of respondents of the study is 128.

Procedure

The customization of the PMMA Shipboard Training Monitoring System has emerged from the pilot testing of the developed PMMA Shipboard Monitoring System System of the researcher last 2013. The system was part of the developmental study conducted by the researcher during his master’s degree. Originally, the system features and focus were the performance of the trainees during their shipboard training.

The PMMA Shipboard Monitoring System System focus on the evaluation of the performance of trainees onboard. The system generates the evaluation process between the trainees, training officers, and administrators from DST and shipping owners. The system has its capability to interact with the different users with the desired or required data needed during the evaluation process. The system also generates report instantly and sends information and data real time.

The system was pilot tested among the 1Cl midshipmen/midshipwomen enrolled during the study. It was deemed working and effective as reflected in the perception of the midshipmen/women. Thus, it was

strongly recommended for initial implementation and be utilized by the PMMA.

The researcher presented the PMMA Shipboard Monitoring System to the PMMA for approval of its implementation. The PMMA expressed its willingness to adopt the system, however, with minor revisions and changes. This gave way to this study-the customization of the PMMA Shipboard Training Monitoring System.

The customization of the PMMA Shipboard Training Monitoring System includes the removal of the evaluation of the performances and rather focuses on the monitoring of the trainees on board. Also, additional changes on the input of personal data of the trainees onboard were reflected in the new system. Additionally, the task and activities reflected with the old FDM Cloud-based system were changed and adopted from the International Seafaring Federation Training Record Book. Furthermore, additional features which will cater projects and assignments of trainees during shipboard training were inserted on the new system.

The researcher together with the DST staff/personnel was in charge with the customization of the old system. The use of ISF-TRB was observed and monitored during the customization process. However during the process, the training book required by the Commission of Audit was released, the Global Met Training Record Book. Thus, aside from ISF-TRB of the respondents, the researcher utilized and integrated the use of the new record training book in customizing the system. Shipboard Monitoring System is linked to having good organizational skills, teamwork and good time management, thus, On board modern equipment, technological and informational systems are evolving with such rapidity that maritime occupations challenged by these developments require the preparation by maritime educational institutions of learners who are capable of adapting to these technological changes, (Sevilla & Arceno, 2017)

The new PMMA Shipboard Training Monitoring System offers more interactive and innovative way of monitoring the shipboard status of shipboard trainees.

Pilot Testing of the Proposed Shipboard Training Monitoring System

The first phase of pilot testing was conducted with 1CL midshipmen/midshipwomen batch 2015. The respondents during the first pilot testing were composed of twenty (20) midshipmen/midshipwomen from each department. The pilot testing was done in the academy's information and laboratory technology room where internet connection was available. The researchers served as the administrators during the first phase of testing. The evaluation of the system effectiveness followed right after the testing.

The second phase of pilot testing was conducted with the next batch of the students, the midshipmen/midshipwomen batch 2016. Additional twenty eight (28) BSMT and thirty three (33) BSMarE students were selected to participate with this phase. The testing was done in the library where internet connection were set-up.

To better facilitate and monitor the second pilot testing, the DST staff/personnel and Department of Research and Development representatives assisted the researcher. The DST staff/personnel act as the system administrator and engaged in the interactive exchange of activities with the midshipmen/midshipwomen which are also engaged in the testing. During this phase majority of the features of the PMMA, Shipboard Training Monitoring System were carefully tested and evaluated. Again, the evaluation of the system effectiveness followed right after the testing, and, this time, DST staff/personnel were also served as evaluators.

Finally, the third pilot testing was conducted with the Academic Department officials as the system administrators. This time, the deans and the vice president tested the system capability to send additional assignments and communications with the target trainees.

Some revisions and changes were accompanied by the conducted pilot testing. Issues and concerns raised by the students and academic officials were noted, documented and applied with the customized system. Other loopholes were answered during the adjustments of the system after the first phase of

testing. Again, together with the assistance of the DST and selected respondents the researcher adjusted the system to align with the revisions suggested during the testing.

Research Instrument

A survey-questionnaire has been used as a research instrument during the pilot testing of the customized PMMA shipboard training monitoring system. The survey-questionnaire form is a checklist type questionnaire where respondents were able to provide their perception on the effectiveness of the proposed customized shipboard training monitoring system during the pilot testing. Parameters of effectiveness include security, accuracy, functionality, user-friendliness and speed of processing.

Validation of Research Instrument

A draft of the questionnaire has been made by the researcher. This was presented before the Department of Research and Development for comments and evaluation. Modifications have been applied to improve further the questionnaire. The final approved copies of the questionnaire have been tested among the midshipmen/midshipwomen of the lower year level.

Data Gathering Procedure

The Researcher immediately retrieved by the researcher from the respondents. The researcher tallied the data that were collected from the respondents to were able to compute, analyze and interpret the result that was used in the presentation and analysis of data.

Statistical Treatment of Data

Statistics is one way of getting the information organized. To have a general view of the whole scenario of the study, statistical tools were used. The following are the statistical tools utilized in the study:

1. **Frequency/Count.** This tool was used to determine the distribution of the respondents in relation to certain variables which utilizes by simply counting.
2. **Percentage.** This tool was used to determine the distribution of the respondents to a certain variables express as a ratio or fraction of 100

$$\text{Formula: } \% = \frac{n}{N} \times 100$$

Where:

% is the percentage

n is the frequency of respondents or responses in a particular variable

N is the total number

3. **Weighted Arithmetic Mean.** The weighted arithmetic mean was utilized to determine the perception of the respondents on the effectiveness of the customized PMMA Shipboard Training Monitoring System of the cadets/cadettes in terms of the parameters as cited in Chapter 1.

Formula:
$$Wm = \frac{fx}{N}$$

Where:

Wm is the weighted mean

fx is the product of the frequency and assign point value of each category

N is the total number

4. **Likert Scale.** This tool was utilized to describe the respondents' perception using a 5-point scale on the effectiveness of the customized PMMA Shipboard Training Monitoring System of the cadets/cadettes in terms of the parameters as cited in Chapter 1

Numerical Point	Scale
5	4.20-5.00
Very Effective (VE)	
4	3.40-4.19
Effective (E)	
3	2.60-3.39
Moderate Effective (ME)	
2	1.80-2.59
Less Effective (LE)	
1	1.00-1.79
Ineffective (I)	

5. **Single-Factor Analysis of Variance.** In this study, the ANOVA was utilized to determine if there is a significant difference on the respondents' perception of effectiveness of the customized PMMA shipboard Training Monitoring System when respondents were grouped according to profile variable. The results in the ANOVA test were utilized to complete the F-test of the study.

Results

This discusses the three important part of the study. It contains the summary of findings, conclusions and recommendations of the researchers.

Restatement of the Problem

The main objective of the study is to customize the PMMA Shipboard Training Monitoring System in line with the DST requirements. Also, the study was focus to determine the effectiveness of the customized system.

Specifically, the study seeks to find answers to the following questions:

5. What are the profile of the respondents in terms of their:
 - 1.4 Position;
 - 1.5 Age; and
 - 1.6 Course?
6. How do administrator-respondents perceive the effectiveness of the customized PMMA Shipboard Training Monitoring System in terms of:
 - 6.1. Accuracy;
 - 6.2. Security; and
 - 6.3. Functionality?
7. How do the trainee-respondents perceive the effectiveness of the customized PMMA shipboard Training Monitoring System in terms of:
 - 7.1. User-friendliness; and
 - 7.2. Speed of processing?
8. Is there a significant difference on the respondents' perception on the effectiveness of the customized PMMA Shipboard Training Monitoring System when grouped according to profile variable?

Assumption/s

The researcher assumed that the customized PMMA Shipboard Training Monitoring System is *very effective* in terms of *accuracy, security, functionality, user-friendliness* and *speed of processing* as perceived by the administrators and trainees.

Summary of Findings

Profile of the Respondents

Position

Sixty (60) or 90 percent of the respondents are trainees while seven (7) or 10 percent are administrators. The administrator-respondents were composed of four (4) personnel of DST and three (3) academic officials.

Age

Sixty (60) or 89.55 percent of the respondents belong to age bracket 19-24; one (1) or 1.49 belong to age bracket 25-30; one (1) or 1.49 belong to age bracket 31-36; one (1) or 1.49 belong to age bracket 37-42; two (2) or 2.99 percent belong to age bracket 43-48; one (1) or 1.49 percent belong to age bracket 49-54; and one (1) or 1.49 percent belong to age bracket 55-61. The mean age of the respondents is 23.74.

Course

Twenty four (24) or 41.8 percent of the trainee-respondents are BSMT students while thirty six (36) or 58.2 percent are BSME students.

Administrator-Respondents' Perception on the Effectiveness of the PMMA Shipboard Training Monitoring System in terms of Accuracy, Security and Functionality

Accuracy: The administrator-respondents perceives the "documentation correct and trustworthy" as *very effective* with a weighted mean 4.7313, standard deviation of .56628, and rank 1; perceives both "conformity of data result", "comprehensive and clear", and "relevance of information to make informed judgment" as *very effective* with a weighted mean of 4.269, standard deviation of .57303 and .59888 respectively, and rank both 3 respectively; perceives "monitoring of cadet's performance" as *very effective* with a weighted mean of 4.6119, standard deviation of .67319 and rank 5; perceives "high level of data assurance" as *very effective* with a weighted mean of 4.5672, standard deviation of .63303, and rank 6; perceives "provides an opportunity to reduce or eliminate errors to the data and information" as *very effective* with a weighted mean of 4.5522, standard deviation of .65790 and rank 7; perceives

"integrity of data achieved" as *very effective* with a weighted mean of 4.5373, standard deviation of .63552 and rank 8; and perceives both "correctness of output provides by the system" and "correctness of output provides by the system" as *very effective* with a weighted mean of 4.53 and rank 8.5 respectively.

The overall weighted mean of the administrator-respondents' perception of the effectiveness of the customized PMMA Shipboard Training Monitoring System in terms of accuracy is 4.6020 interpreted as *very effective*.

Security: The administrator-respondents perceives "user management of systems access" as *very effective* with a weighted mean of 4.6061 and rank 1; perceives both "systems backup is provided" and "protection from loss" as *very effective* with a weighted mean of 4.5970 respectively, standard deviation of .62909 and .60452 and rank 2.5 respectively; perceives "individual use account and access code is provided" as *very effective* with a weighted mean of 4.5821, standard deviation of .63124, and rank 4; perceives both "high level of security" and "accessibility of the user account management" as *very effective* with weighted mean of 4.5672 respectively, standard deviation of .72245 and .67921, and rank 5.5 respectively; perceives both "protection from systems damage" and "availability of facilities that maintains the integrity of data and information" with a weighted mean of 4.5522 respectively, standard deviation of .68054 and .63445, and rank 7.5; and perceives "protection against unauthorized access" as *very effective* with a weighted mean of 4.5373, standard deviation of .72464, and rank 9.

The overall weighted mean of the administrator-respondents' perception in the effectiveness of the customized PMMA Shipboard Training Monitoring System in terms of security is 4.5731 interpreted as *very effective*.

Functionality: The administrator-respondents perceives both "adaptability of the system" and "flexible to meet user requirements" as *very effective* with a weighted mean of 4.6866, standard deviation of both

.58281 respectively, and rank both as 1.5; perceives both “technical reliability of service” and “allows expansion and modification of the system” as *very effective* with a weighted mean of 4.5970, standard deviation of both .62909 and rank 3.5; perceives “a certain system level is maintained even when trouble occurs” as *very effective* with a weighted mean of 4.4776, standard deviation of .70406, and rank 5; and perceives “modifications of the systems do not affect the subsystem” as *very effective* with a weighted mean of 4.4627, standard deviation of .68154, and rank 6.

The overall weighted mean of the administrator-respondents’ perception of the effectiveness of the customized PMMA Shipboard Training Monitoring System in terms of functionality is 4.5849 interpreted as *very effective*.

Trainee-Respondents’ Perception on the Effectiveness of the PMMA Shipboard Training Monitoring System in terms of User-friendliness and Speed of Processing

User-friendliness: The trainee-respondents perceives both “response time for reply to request”, “system is easy to use”, “always on time and can be relied” and “normal operation are restores readily, when failure occur” as *very effective* with a weighted mean of 4.6886 respectively, standard deviation of .60825, .55620, .59888, and .54594, and rank 2.5; perceives both “easy to understand the functions/commands”, “integrity of systems in terms of performing its functions”, “ease of procedure”, and “timeliness of information” as *very effective* with a weighted mean of 4.6119, standard deviation of .62656, .57617, .60190, .67319, and .62909, and rank 7.5; and perceives “allows easy operation management” as *very effective* with a weighted mean of 4.5970, standard deviation of .62909, and rank 9.

The overall weighted mean of the trainee-respondents’ perception in the effectiveness of the customized PMMA Shipboard Training Monitoring System in terms of user-friendliness is 4.6304 interpreted as *very effective*.

Speed of Processing: The trainee-respondents perceives “overall rating of the systems responsiveness” as *very effective* with a weighted mean of 4.6716,

standard deviation of .56106, and rank 1; perceives “level of responsiveness” as *very effective* with a weighted mean of 4.6567, standard deviation of .56548, and rank 2; perceives both “provides fast transaction”, and “accessibility of information” as *very effective* with a weighted mean of 4.6418, standard deviation of .56946 and .59548, and rank 3.5; perceives both “frequency of customer request”, “availability of documents within the specified period of time”, “provides good response high throughput” and “network conditions” as *very effective* with a weighted mean of 4.6269, standard deviation of .54594, .57303, .57303, and .67050, and rank 5.5; perceives “response time” as *very effective* with a weighted mean of 4.5970, standard deviation of .60452 and rank 9; and perceives “overall quality of the process” as *very effective* with a weighted mean of 4.4737, standard deviation of .68721, and rank 10.

The overall weighted mean of the trainee-respondents’ perception in the effectiveness of the customized PMMA Shipboard Training Monitoring System in terms of speed of processing is 4.6190 interpreted as *very effective*.

Significant Difference on the Respondents’ Perception on the Effectiveness of PMMA Shipboard Training Monitoring System when grouped according to Profile Variable

Position: The observed level of significance shows that there is significant difference on the respondents’ perception on the effectiveness of the customized PMMA Shipboard Training Monitoring System in terms of speed of processing when respondents are grouped according to position.

Age: There is no significant difference on the respondents’ perception on the effectiveness of the customized PMMA Shipboard Training Monitoring System in terms of accuracy, security, functionality, user-friendliness and speed of processing when respondents are grouped according to age.

Course: There is significant difference on the respondents’ perception on the effectiveness of the customized PMMA Shipboard Training Monitoring System in terms speed of processing when respondents

are grouped according to course as shown in the level of significance.

Conclusions

From the foregoing findings, the following conclusion was drawn:

1. A typical trainee-respondent is 23.74 year old BSMarE cadet.
2. The administrator-respondents perceived the customized PMMA Shipboard Training Monitoring System in terms of accuracy, security, and functionality as very effective.
3. The trainee-respondents perceive the customized PMMA shipboard Training Monitoring System in terms user-friendliness and speed of processing as very effective.
4. Respondents' position and course affects their perception on the effectiveness of the customized PMMA Shipboard training Monitoring System in terms of speed of processing.

Recommendations

The overall respondents' perception on the developed PMMA Shipboard Training Monitoring System is very effective, A measurement campaign has been conducted aboard the shipboard monitoring to a ferry boat to study the propagation challenges of wireless communication in this harsh environment, (Volosencu, 2012). Thus the researcher would like to recommend the following:

1. The approval of the use of the customized PMMA Shipboard Training Monitoring System for the trainees of the Philippine Merchant Marine Academy on board.
2. The immediate full implementation of the PMMA Shipboard Training Monitoring System.
3. Further study must be done to improve its features and capabilities like locking of grading sheet, notification code generated, and summation of total months of embarkation.
4. Further monitoring of the system in its implementation.

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