

## **Analysis of Participant Satisfaction Level toward Ecdis Training Services and Facilities**

Sarifuddin<sup>1</sup>, Agus Tjahjono<sup>2</sup>, Yustina Sapan<sup>3</sup>, Andy Wahyu Hermanto<sup>4</sup>

<sup>1,2</sup> *Engineering Department, Semarang Merchant Marine Polytechnic (PIP Semarang), Singosari 2 a Semarang, Central Java, 50242, Indonesia.*

<sup>3</sup> *Nautical Department, Semarang Merchant Marine Polytechnic (PIP Semarang), Singosari 2 a Semarang, Central Java, 50242, Indonesia*

<sup>4</sup> *Port and Shipping Management Department, Semarang Merchant Marine Polytechnic (PIP Semarang), Singosari 2 a Semarang, Central Java, 50242, Indonesia*

<sup>2</sup> *Corresponding Author : Agus Tjahjono*

---

**Abstract:** Based on the 2010 Amendments on STCW (Standards Training of Certification and Watchkeeping for Seafarers), in Chapter II, at the operational and management level, it is mandated that commercial vessel's deck officers are obliged to take part in ECDIS (Electronic Chart Display and Information System) training in approved training and education institutions. This research was aimed to (1) identify and analyze the effect of service quality (tangibility, reliability, responsiveness, assurance, empathy) toward the participant satisfaction on ECDIS training in SMPP (Semarang Merchant Marine Polytechnic), (2) to determine the most dominant variable among the five (tangibility, reliability, responsiveness, assurance and empathy) toward the participant satisfaction on ECDIS training in SMPP. Based on the analysis, in regard to participant satisfaction level toward the implementation of ECDIS training in PIP Semarang, it was found that 4% of participants were very satisfied by the services, 40% of them were satisfied, 42% of them rated the service as moderate, 13% of them were dissatisfied, and 1% of the participants were very dissatisfied.

**Keywords:** STCW 2010 Amendment, ECDIS training, SMPP (Semarang Merchant Marine Polytechnic), service quality, participant satisfaction

---

Date of Submission: 02-04-2019

Date of acceptance: 17-04-2019

---

### **I. INTRODUCTION**

In 2010, significant changes known as "Manila Amendment" to the Convention on STCW (Standards Training of Certification and Watchkeeping for Seafarers) was officially ratified by IMO (International Maritime Organization). The amendment was made in order to bring the Convention and Code up to date with new developments after its initial establishment in 1978 and its revision in 1995.

The Convention amendments would be adopted with a tacit acceptance procedure which had been agreed indicating that amendments would be accepted by 1<sup>st</sup> July 2011 unless more than 50% of the parties to the STCW objected the changes. As a result STCW Amendments are set to enter into force on January 1<sup>st</sup>, 2012.

Some of key improvements realized through the amendments are as follows (1) on Chapter II Operational and Management Levels, it is stated that ECDIS (Electronic Chart Display and Information System) will be required training for all deck officers on all vessels that are equipped with ECDIS. ECDIS will be treated the same as ARPA (Automatic Radar Plotting Aid) or the GMDSS (Global Maritime Distress Safety System) training, where it is an STCW restriction from serving on equipped vessels if these training certifications are not held. By 2012, nearly all vessels more than 200 gross tons will be required under a separate law to have ECDIS equipment. By default, any deck officer on vessels of more than 200 tons will need ECDIS training.

The SMPP (Semarang Merchant Marine Polytechnic) is one of the TIU (Technical Implementation Units) of Human Resources Development Agency which are designated to carry out trainings for seafarers, one of which is ECDIS. There are several TIUs appointed to carry out ECDIS training one of which is SMPP. Thus, in order to meet the minimum service standards, some improvements are needed. It is assumed that the greater the community interest to take part in ECDIS training, the higher market value SMPP has to compete with other TIUs. Market share usually chooses products and services that provide the greatest value. Thus, in order to either attract more market share and maintain existing market share, SMPP needs to completely acknowledge their needs by providing the best quality and service.

Based on the preliminary interviews to one of the ECDIS training instructors, it was found that some elements of the training were below standards, there were only 6 units of equipments for 18 participants in each class. It means that one single unit would be utilized by 3 participants instead of one single participant. Moreover, its lack number of instructors each week affected the course waiting list. In some cases, the participants had to wait up to 3 months before starting the course. To order to obtain a high market share, SMPP needs apply a right marketing strategy.

This research was aimed to (1) determine and analyze the effect of service quality (tangibility, reliability, responsiveness, assurance, and empathy) toward ECDIS training participant satisfaction in SMPP; (2) determine the effect of the most dominant variables (tangibility, reliability, responsiveness, assurance, and empathy) toward the participant satisfaction.

## II. MATERIAL AND METHODS

### Description of the study sites

The research was conducted at SMPP, Central Java, Indonesia. The data were taken through questionnaire to ECDIS training participants. The study started in February to June 2016. The sample was taken based on Isaac & Michael's formula<sup>8</sup> :

$$S = \frac{\lambda^2 \cdot N \cdot P \cdot Q}{d^2(N - 1) + \lambda^2 \cdot P \cdot Q}$$

Based on this formula, 70 respondents were taken as the sample for the 80 respondents of population with margin of error of 1%. The data were obtained through questionnaires to ECDIS training participants. These data were used to determine the level of importance and training performance.

The level of importance of service quality and performance was determined by using the scale of 1-4 (a) scale 4 for very important, (b) scale 3 for important, (c) scale 2 for less important, and (d) scale 1 for not important. On the other hand, for the level of customer performance was ranked by using the scale of 4 as follows (a) scale 4 for very good, (b) scale 3 for good, (c) scale 3 for less good, and (d) scale 1 for poor.

The respondents were given some questionnaires regarding their gender, educational level, sailing experience and status on board. in regard to the level of performance and the level of importance, the questionnaire covered five aspects tangibility, reliability, responsiveness, and assurance, empathy<sup>7</sup>.

The aspects of tangibility consist of cleanliness and neatness of the building or laboratory, the employees, facilities provided (classroom facilities, simulators, waiting rooms), types and the performance of ECDIS equipment in SMPP. The aspects of reliability include the ECDIS certificate issuance process, SMPP's response toward participants academic problems, and the high scheduling accuracy. The aspects of responsiveness include the administrative services or documents, and clarity of information (time and place). The assurance aspects include the knowledge and skills of the ECDIS instructors and technicians. The empathy aspects include individual attention and responsibility for security and comfort for ECDIS training participants.

### Data Analysis Technique

The level of suitability is the comparison result between the performance score and level of importance score. This level of suitability would determine the priority order of the factors which affected customer satisfaction. In this study, two variables would be applied represented by x and y. The x was the level of the company performance which was expected to seek for customer satisfaction whereas the y was the level of customer interest.

The formula of respondent suitability level is as follows<sup>6</sup>:

$$Tk_i = \frac{x_i}{y_i} \times 100\% \dots\dots\dots(1)$$

where  $Tk_i$  = the level of respondents suitability,  $x_i$  = the assessment score of company performance,  $y_i$  = the assessment score of customer interest. The x-axis would represent the score of implementation level while the y-axis would represent the level of importance. In a simplified formula, each factor which influenced the customer satisfaction would be determined by using these following formulas:

$$\bar{x} = \frac{\sum x_i}{n} \dots\dots\dots(2)$$

$$\bar{y} = \frac{\sum y_i}{n} \dots\dots\dots(3)$$

where  $\bar{x}$  = the average score of satisfaction level,  $\bar{y}$  = the average score of interest level, and n = the number of respondents.

A Cartesian diagram is divided into four quadrants and bounded by two perpendicular lines:  $\bar{x}$  and  $\bar{y}$ .  $\bar{x}$  represents the average of customer satisfaction based on all factors or attributes whereas  $\bar{y}$  is the average of the the level of importance of all factors which had influenced the customer satisfaction. There were twenty factors with k-factor, where k = 12. The formula are as follows:

$$\bar{x} = \frac{\sum_{i=1}^N \bar{x}}{k} \dots\dots\dots(4)$$

$$\bar{y} = \frac{\sum_{i=1}^N \bar{y}}{k} \dots\dots\dots(5)$$

where k = the number of attributes which influence the customer satisfaction (In this study, k = 12).

Furthermore, the element levels were described into four quadrants of the Cartesian diagram. In addition, correlation analysis of qualitative data could also be carried out to identify the relation among all factors. The following figure is a Cartesius diagram with its four quadrants which represent some different functions. Quadrant A shows factors which were assumed to affect the customer satisfaction including the important elements of services which has not implemented of which, by customer, is described as disappointing. Quadrant B shows the basic service elements which have been successfully implemented by the company which needs to be maintained, considered as important and very satisfying. Quadrant C shows some factors that are less important for the customer that the implementation by the company is normal and is considered less important and less satisfying. Quadrant D shows the factors that influence customers are less important but the implementation is excessive, considered less important but very satisfying (Figure 1).

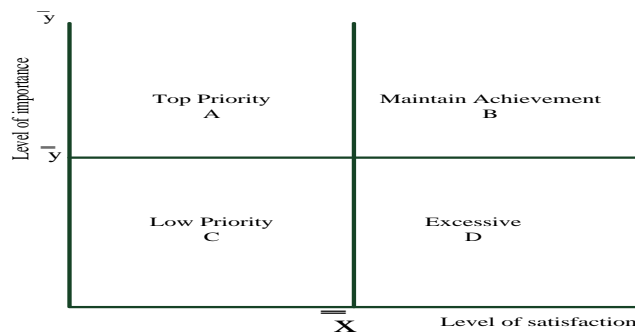


Figure 1. Cartesian diagram

III. Result

Based on the questionnaire, the participants consisted of 59 male and 11 female. The percentage was 84% male and 16% female (Figure 2).

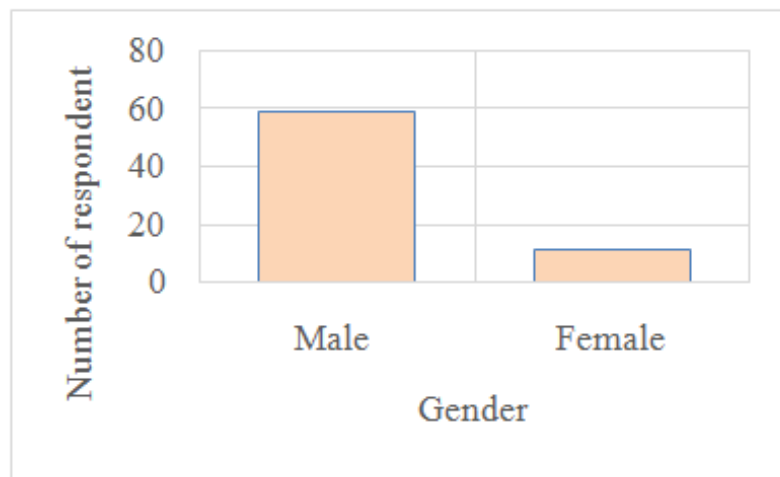
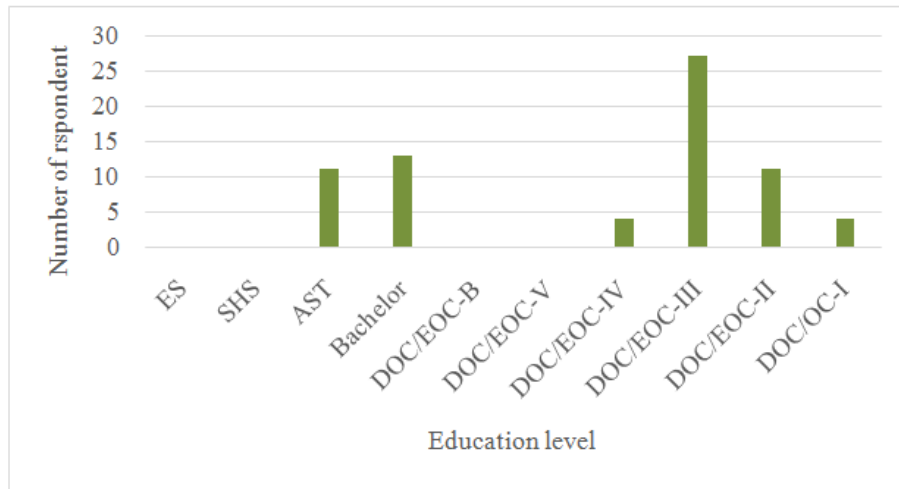


Figure 2. Gender distribution of ECDIS training participants in SMPP

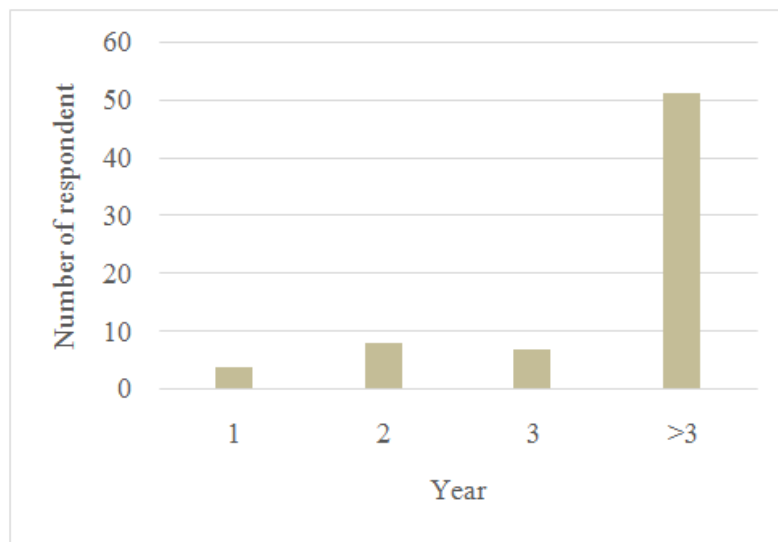
Based on the data, it was found that the education level of the most ECDIS training participants was DOC (Deck Officer Class)-III. The percentages consisted of 0% of the participants had primary schools, 0% of secondary schools, 16% of Diploma degree, 19% of Bachelor degree, 0% of DOC/EOC (Deck Officer Class/Engineer Officer Class)-Basic, 0% of DOC/EOC-V, 6% of DOC/EOC-IV, 39% of DOC/EOC-III, 16% of DOC/EOC-II, and 6% of DOC/EOC-I (Figure 3).



ES : Elementary School  
 SHS : Senior High School  
 AST : Advanced's Seafarer Training  
 DOC : Deck Officer Class  
 EOC : Engine Officer Class

**Figure 3.** Education level of ECDIS training participants in SMMP

The questionnaire also revealed the participant's onboard experience on commercial vessels. It was found that 6% of participants had 1 year of experience, 11% had 2 years of experience, 10% had 3 years of experience, and 73% had more than 3 years of experience (Figure 4).



**Figure 4.** On board experience of ECDIS Training participants in SMMP

The data showed that 24% of them served as Master, 27% as Chief Officer, 23% as Second Officer, 13% as Third Officer, and 13% served as Cadet (Figure 5).

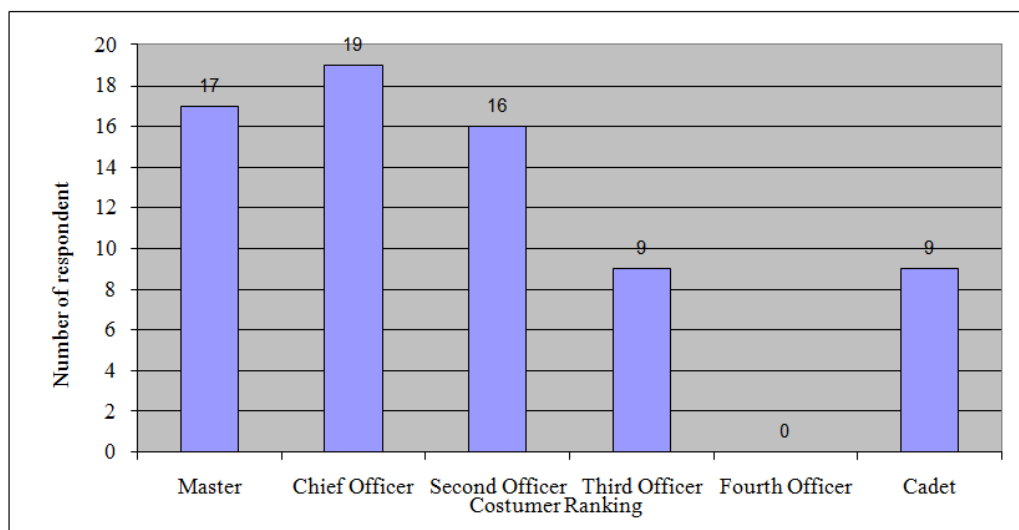


Figure 5. Respondent’s ranks on board

Tangibility aspects consist of cleanliness and neatness of the building, the facilities, the simulators, the waiting rooms, and the ECDIS equipment. The questionnaire showed that the cleanliness of the building was rated as good reaching the score of 156, very good with 24, and less good reaching score of 24. Respondent assessment of the building facilities was dominated by good reaching 150, 16 for very good and 32 for less good. Regarding the equipment of ECDIS, it was rated as good reaching 165, 12 for good, and 24 for less good (Figure 6).

The aspects of reliability include the ECDIS certificate issuance process; SMPP’s responses toward student’s academic problems; and the high scheduling accuracy. In regard to the certificate issuance process, it was rated as good reaching 108, followed by very good (40) and less good (40). SMPP’s response toward student’s problems was assessed good reaching 129, followed by less good (38) and good (24). On the other hand, the high scheduling accuracy was rated as good reaching 123, and was followed by less good (44) and good (28).

Responsiveness aspects include the ability of employees to be responsive to the administrative services and clarity of information (time and place). In this study, the responsive aspect was assessed as good reaching 96 and was followed by less good (60) and very good (32). The certainty aspects include the knowledge and skills of the ECDIS instructors, technicians, and/or operators. In this research, these aspects were rated as good reaching 159 followed by less good (26) and good (16). The technicians and operator’s of ESDIC in SMMP were rated as good reaching 147 followed less good (32) and very good (8).

The fifth aspect, the empathy aspects, include the individual attention and responsibility to the participant’s safety and comfort. Individual attention to ECDIS participants was rated as good reaching 105 followed by less good (62) and good (8). On the other hand, the responsibility of the safety and comfort assessed as good (144) followed less good (40) and very good (score of 8).

In this research, a recapitulation of each aspect was also made. The first aspect, tangibility was rated as good reaching 157, followed by less good (26.7) and very good (17.3). The aspects of reliability was assessed as good reaching 120 followed by less good (40.7) and very good (33.3). The aspect of responsiveness was assessed as good reaching 121.5 followed by less good (43) and very good (26). The certainty aspect was rated as good reaching 153 followed less good (29) and very good (12). The fifth aspect, the empathy was rated as good reaching 124.5 followed by less good (51) and good (8).

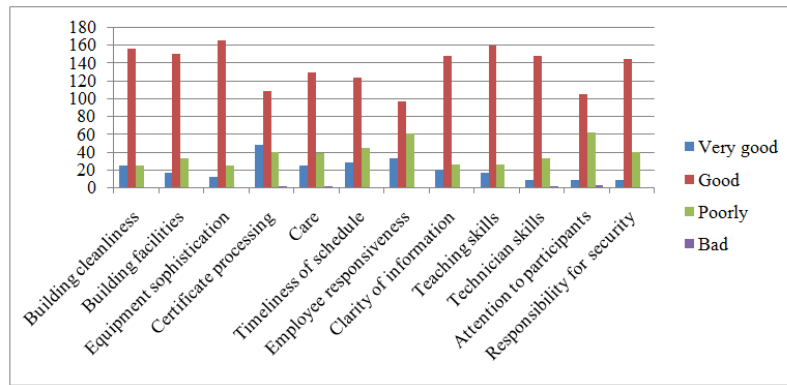


Figure 6. Respondents' assessment of the aspects

The level of importance was also examined based on the five aspects. Based on the tangibility aspects, the cleanliness and neatness were rated as important reaching 144 followed by very important (56) and less important (14). The training facility was rated as important reaching 153 followed very important (56) and less important (10). The ECDIS equipment was rated as important reaching 134 followed very important (104) and less important (0) (Figure 7).

The aspects of reliability included ECDIS certificate issuance process and SMMP's response toward student's problems and the high scheduling accuracy. The certificate issuance process was rated as important reaching 60 followed very important (196) and less important (2). SMMP's responses toward student's problems was rated as very important response (196) followed by important (60) and less important (0). The high scheduling accuracy was rated as very important (216) followed by important (48) and less important (0) (Figure 7).

The third aspect, responsiveness, included the ability of SMMP to be responsive to administrative services and the clarity of information (time and place). The ability of SMMP employees to be responsive to administrative services was rated as very important (132) followed by important (108) and less important (0). On the other hand, the clarity of information (time and place) was rated as very important (124) followed by important (115) and less important (0).

The fourth aspect, certainty, consists of the knowledge and skill of the ECDIS instructors, technician and/or operator. The level of importance of the ECDIS instructor's knowledge and skills was rated very important (120), important (117) and less important (2). The ECDIS technicians or operators's knowledge and skill was rated as important (117), very important (112), and less important (2). The last aspect was empathy consisting of individual attention to ECDIS participants and responsibility to the safety and comfort of ECDIS participants. The level of importance of individual attention to ECDIS participants was rated as important (123), very important (76) and less important (16).

Based on the five aspects of the level of importance, an average of each aspect was determined. The first aspect, the tangibility was rated as important reaching 114.3 followed very important (101.3) and less important (8). The level of reliability was rated as very important (202.7) followed by important (56) and less important (0.7). The level of responsiveness was rated as very important (128) followed by important (111.5) and less important (0). Certainty was rated as importance (117), very important (116) and less important (2). The empathy was rated as importance (123), very important (78) and less important (15).

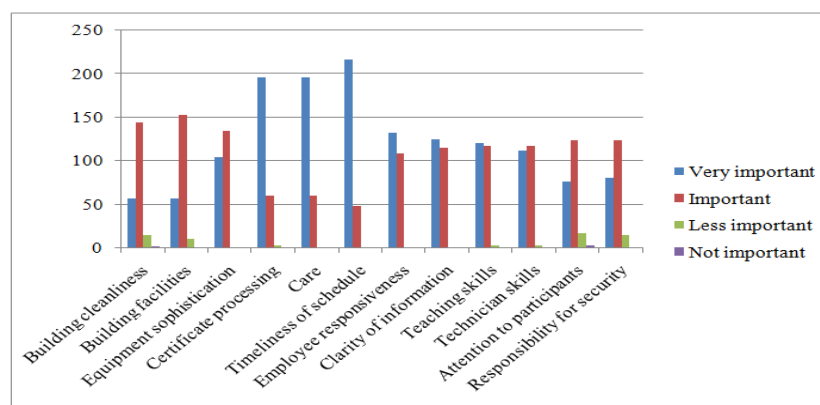
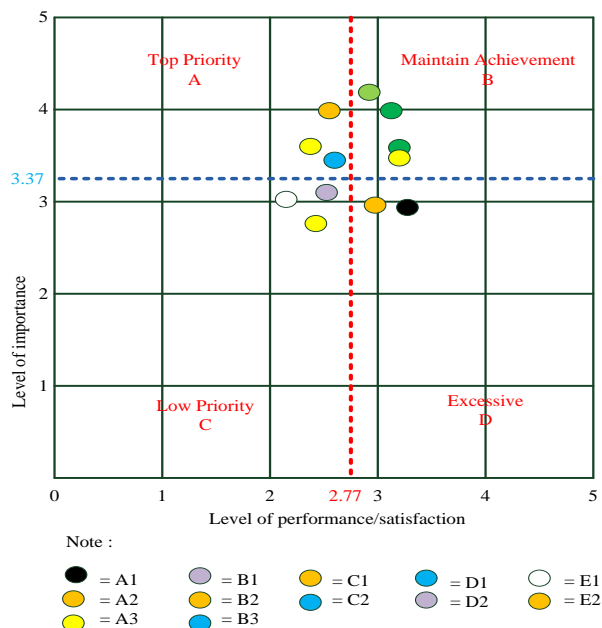


Figure 7. The level of importance of the five aspects

Based on the diagram, it can be seen that the factors or attributes which influenced the participant’s satisfaction level could be found in four quadrants. Any factors or attributes which existed in quadrant A were hopefully prioritized as they were assumed to be very important to the customers while their implementation had not been satisfactorily executed. The factors included the concern and response of SMMP (lecturers, technicians, clerks) on customer’s problems; the ability of SMMP’s employees to be responsive toward administrative services or documents; and the clarity of information (time and place) (Figure 8).

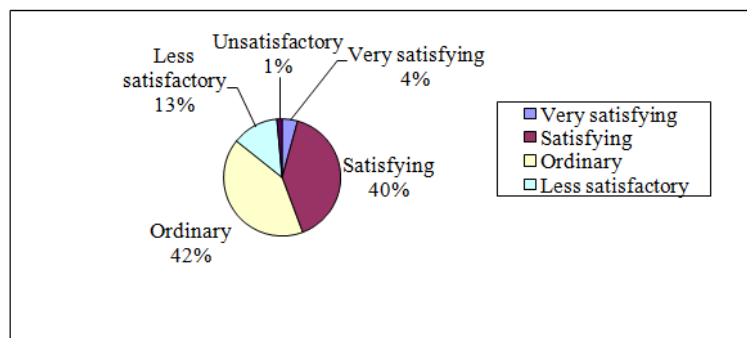
Based on what is shown in quadrant B, it was found that the factors or attributes found in this quadrant needed to be maintained as its implementation was said to be satisfactorily executed. The factors belonged to quadrant B included the high scheduling accuracy organized by SMMP the ECDIS certificate issuance process; the knowledge and skills of ECDIS instructors; and the type and performance of ECDIS equipments. On the other hand, the factors found in quadrant C were considered as less important while the implementation was rated as normal or sufficient. The factors included in the C quadrant were the ability of SMMP employees to be responsive to the administration services; knowledge and skills of the ECDIS technicians or operators; and individual attention to ECDIS training participants.

In quadrant D, there were factors that influence the participant’s satisfaction. However, the factors were considered as excessive in its implementation as while they were assumed as less important, it was excellently implemented that it was said to be ineffective. The factors belonged to this quadrant D included the cleanliness and tidiness of the training laboratory, employees, and facilities provided (classrooms, simulators, waiting rooms, and other facilities).



**Figure 8.** Cartesian diagram of ECDIS training

The figure below shows the percentage of customer satisfaction level on the implementation of ECDIS training in SMMP. It is shown that 4% of customers stated that they were very satisfied with the service, 40% of them rated the services as satisfying, 42% of them rated moderate, 13% of said it was less satisfactory, and 1% of them claimed that the service was very unsatisfactory ( Figure 9).



**Figure 9.** The level of customer satisfaction toward the implementation of ECDIS training

#### **IV. DISCUSSION**

This study focused on the level of participant satisfaction toward the quality of education and training services and facilities. The participant's satisfaction shows a positive relationship between the quality of service facilities and infrastructures<sup>9</sup>. Based on the research, it was found that the quality of facilities and infrastructure services and the participant's satisfaction were highly correlated. Consumer satisfaction of a service needed to be maintained in order to increase the consumer buying power, expand the market share, and prevent the consumers from switching their service providers<sup>3</sup>. The research's subject was students living in a boarding school. The finding showed that student's satisfaction was influenced by several criteria : the boarding school, the selection of school enrollment, learning and evaluation methods, the teacher performance, and physical facilities fulfillment<sup>4</sup>.

In this Cartesius diagram, there were some factors which were considered as main priorities included the concern of SMPP (lecturers, technicians, and clerks) toward customer's problems; the ability of SMPP employees to be responsive to administrative services or documents; and the clarity of information (time and place). Other research on customer's satisfaction<sup>11</sup>. Their research focused on agritourism facilities and found some factors which were said as the main priorities : promotion, worship facilities, and location arrangement. Customer's satisfaction on hotel services by using the fuzzy method was determined by the level of room service and price, each of which was scored 5.5. This score means that each variable has 55% influence on consumer's satisfaction<sup>10</sup>.

The satisfaction level of education services was simultaneously influenced by the factors of tangibility, reliability, responsiveness, assurance and empathy. However, partially, reliability, responsiveness and assurance indicators did not significantly influence student's satisfaction<sup>5</sup>. The level of customer's satisfaction on drinking water service was influenced simultaneously by reliability, responsiveness, confidence, empathy and tangibility. Based on the research, Susanto found that the water continuity and the responsiveness on handling complaints were at a low level of satisfaction; the water meters was rated moderate; and the payment locations was assumed to have a high satisfaction<sup>1</sup>.

In order to increase of customer satisfaction in store service, some factors needed to be improved and maintained including installing more air conditioners; installing a bigger cashier counter; maintaining restroom cleanliness; providing more shopping baskets; installing and managing a pricelist board periodically; managing the parking lots; and deversing the products<sup>2</sup>. Another research on customer satisfaction was also carried out by Hafid. He found that the satisfaction level of hospital customers was influenced by the performance of nursing staff<sup>12</sup>. It also found that the satisfaction level to the communication service was influenced by these following factors as follows customer service, responses to customer complaints, payment services, and timeliness of service<sup>13</sup>. On the other hand, the customer satisfaction on purchasing the products was influenced by the product's quality, risk, and brand<sup>14</sup>.

#### **V. CONCLUSION**

Generally, based on the research, service users at ECDIS training were satisfied with the current conditions and service quality. However, in order to both maintain and increase the numbers of customers, SMMP needs some improvement in some aspects including SMPP's (lecturers, technicians, officers at the counter) awareness toward the problems faced by customers; the ability of SMMP employees to be responsive to administrative services or documents; and the clarity of information (time and place).

It was also found that some factors needed to be maintained since they had fulfilled the customer's expectation. The factors included maintaining the high scheduling accuracy; the certificate issuance process; the ECDIS instructor's knowledge and skills; and the performance of ECDIS equipments used in SMPP. In regard to the level of customer satisfaction, it was found that 4% of the customers stated that they were very satisfied, 40% of the customers said that the service was satisfactory, 42% of the customers rated the service as moderate, 13% of the customers said that the service was less satisfactory, and 1% of customers were very unsatisfied with the ECDIS training service.

In response to customer's complaints, there are four important aspects which need to be maintained including (1) empathy for unhappy customers; (2) quick response to customer's complaints; (3) equity in problem solving or complaint handling; and (4) ease contact information.

Some strategies can be possibly applied to improve the company performance. The strategies included (1) monitoring and measuring customer satisfaction on an ongoing basis; (2) providing education and training regarding communication, salesmanship, and public relations to the management and employees; (3) including the ability to satisfy customers into the employee performance appraisal system; and (4) giving more employee empowerment.



## REFERENCES

- [1]. Yuliarmi N.Y., Riyasa P. 2007. [Analysis of the factors that influence customer satisfaction with the services of Local Water Company Denpasar City]. *Buletin Studi Ekonomi*, Volume 12, 1 : 9-28 [in Indonesian].
- [2]. Yola M., Budianto D. 2013. [Analysis of customer satisfaction with service quality and product prices at supermarkets by using the IPA (Importance Performance Analysis) method]. *Jurnal Optimasi Sistem Industri*, Volume 12, 12 : 301-309 [in Indonesian].
- [3]. Wardhani E.K. 2006. [Measurement of the level of satisfaction of aviation service consumers (case studies on Garuda Indonesia Semarang-Jakarta flight services)]. *Jurnal Studi Manajemen & Organisasi*, Volume 3, 1 : 40-63 [in Indonesian].
- [4]. Udiutomo P. 2011. [Analyze the level of student satisfaction with Indonesia's smart ekselensia program services in 2011]. *Jurnal Pendidikan Dompot Dhuafa*, Volume I : 1-19 [in Indonesian].
- [5]. Susanto H. 2014. [The influence of academic services on the satisfaction of students of the Univeristas Terbuka postgraduate program in the Mataram Distance Learning Unit ]. *Jurnal Pendidikan Terbuka dan Jarak Jauh*, Volume 15, 2 : 88-98 [in Indonesian].
- [6]. Supranto. 2001. [Measurement of customer satisfaction levels, new edition]. Jakarta : Rineka Cipta [in Indonesian].
- [7]. Sopiati P., 2010. [Learning management based on student satisfaction]. Bogor : Ghalia Indonesia [in Indonesian].
- [8]. Sarwono J. 2006. [Quantitative and qualitative research methods]. Yogyakarta : Graha Ilmu [in Indonesian].
- [9]. Purwandani D., Sutarsih C., Sururi. 2016. [Effect of service and infrastructure quality on student satisfaction in the technology and vocational education faculties of the Universitas Pendidikan Indonesia]. *Jurnal Tata Kelola Pendidikan*, Volume 1, 1 : 80-90 [in Indonesian].
- [10]. Pratiwi I., Prayitno E. 2005. [Analysis of customer satisfaction based on the level of service and room prices using fuzzy applications with Matlab 3.5]. *Jurnal Ilmiah Teknik Industri*, Volume 4, 2 : 66-77 [in Indonesian].
- [11]. Oktaviani R.W., Suryana R.N. 2006. [Analysis of visitor satisfaction and development of agro tourism facilities (case studies at Pasirmukti tourism gardens, Bogor)]. *Jurnal Agro Ekonomi*, Volume 24, 1 : 41-58 [in Indonesian].
- [12]. Hafid M.A. 2014. [The relationship between nurse's performance on the level of satisfaction of Yankestis users in nursing services at Stech Yusuf Hospital, Gowa Regency]. *Jurnal Kesehatan*, Volume VII, 2 : 368-375 [in Indonesian].
- [13]. Hadiati S., Ruci S. 1999. [Analysis of service quality performance on customer satisfaction in Telkomsel Malang Area]. *Jurnal Manajemen dan Kewirausahaan*, Volume 1, 1 : 56-64 [in Indonesian].
- [14]. Ferrinadewi E. 2005. [Product attributes considered in purchasing cosmetics and their influence on consumer satisfaction in Surabaya]. *Jurnal Manajemen & Kewirausahaan*, Volume 7, 2 : 139-151 [in Indonesian].

IOSR Journal Of Humanities And Social Science (IOSR-JHSS) is UGC approved Journal with Sl. No. 5070, Journal no. 49323.

Agus Tjahjono. "Analysis of Participant Satisfaction Level toward Ecdis Training Services and Facilities." *IOSR Journal of Humanities and Social Science (IOSR-JHSS)*. vol. 24 no. 04, 2019, pp. 36-44.