International Journal of Instruction *April 2023 ● Vol.16, No.2*
e-ISSN: 1308-1470 ● www.e-iji.net *p-ISSN: 1694-609X*
pp. 965-984

Article submission code: 20220507111519
Received: 07/05/2022 Revision: 19/11/2022
Accepted: 12/12/2022 OnlineFirst: 25/02/2023

Relevance of Communicative, Team Effectiveness, and Long-Range Planning Skills in Vessel Crewmembers

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In recent years, soft skills have become increasingly important in many areas of the labor market and in the training of higher education students. This paper explores the perception that different crewmembers of Spanish flag vessels have about the influence of different soft skills in their work environment. A quantitative study is developed based on the answers to a survey to assess the different soft skills. The study involved 120 crewmembers of Spanish vessels, representing all possible positions and all types of coastal or ocean-going vessels. Student's t-test and ANOVA test were used to compare mean perceptions by gender, age range, navigation experience, position held, position experience, navigation class and vessel type. Three families of soft skills are distinguished: (i) communicative skills, (ii) team effectiveness, and (iii) long-range planning skills. In all of them, participants gave very high ratings, especially in team effectiveness. Significant differences were also identified in the perception of communicative skills and long-range planning skills when differentiated by position held and in the perception of communicative and teamwork skills when differentiated by type of vessel.

Keywords: soft skills, vessel, crew, survey, quantitative study, marine engineering

Citation: Bouzón, R., Antón-Sancho, Á., Amado-Sánchez, Y., & Vergara, D. (2023). Relevance of communicative, team effectiveness, and long-range planning skills in vessel crewmembers. *International Journal of Instruction*, *16*(2), 965-984. https://doi.org/10.29333/iji.2023.16251a

INTRODUCTION

General Introduction

The success of people's professional life development depends on two types of skills or competencies: hard and soft skills (Buxarris, 2013). Hard skills are the abilities needed to perform a given task and can be achieved through training and education (Singer et al., 2009). On the other hand, soft skills are the capabilities related to behavior and can be modified, thus generating different characteristics in the person (Espinosa & Gallegos, 2020; Ortega et al., 2016). Hard skills are usually trained quickly, while soft skills may take years and require specific training to be acquired (Singer et al., 2009).

Competency-based training became relevant in Europe following the emergence of the European Higher Education Area (EHEA). This led universities to reform their respective training projects to adapt them to the competency demands of a globalized world of work (Rodríguez, 2008; Montero, 2010). Unlike traditional teaching, where the teacher transmits what he/she knows to a passive student (Martínez-Clares et al., 2008), competency-based training seeks to achieve a type of learning in which the student acquires knowledge, practical and communicative skills, and teamwork. All these competencies seek to meet the demands that the global economic world places on young people entering the world of work (Echeverría, 2002). Specifically, the Organisation for Economic Co-operation and Development (OECD) has collaborated with institutions to establish a set of key competencies through the PISA program. In Spain, these competences are expressed as follows (BOE, 2015): (i) linguistic communication; (ii) mathematical competence and basic competencies in science and technology; (iii) digital competence; (iv) learning to learn; (v) social and civic competencies; (vi) sense of initiative and entrepreneurship; and (vii) cultural competencies and expressions.

The literature presents competency-based learning as strongly linked to the acquisition of soft skills (Wesołowski and Makhubu, 2022). Soft skills have then become very important in the education and instruction sector in recent years. In fact, it is possible to find in the specialized literature many designs of didactic methodologies specifically focused on soft skills work (Halimah and Sukmayadi, 2019; Betti et al., 2022). Among the soft skills of greatest formative interest are communication (Rohid et al., 2019) and teamwork skills (Nguyen et al., 2021), due to their transversal nature, since they are present in any work activity in today's globalized society. The soft skills related to long-term project development are also of great interest in training and, in fact, are at the foundation of the project-based learning methodology, which is currently widely implemented and provides excellent training results (Putra et al., 2021; Torres et al., 2021). In this sense, researchers have endeavoured to study the factors that have the most decisive impact on education and professional training in terms of soft skills training, and have identified, among others, the culture of the learners, or the conditions of the training environment (Ahmad et al., 2019).

The instruction of professionals in navigation is also carried out from a competency perspective (Medvedev, 2017). In this area, competencies are linked to meet the objectives intended by the International Maritime Organization (IMO), which is the United Nations agency specialized in the safety and security of navigation and the prevention of marine pollution caused by vessels (Bouzón, 2017). In this sense, the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers 1978 (STCW78) establishes the minimum standards to be met or exceeded by the countries that have ratified it, having been approved by the IMO in 1978 and entered into force in 1984. It also lays the foundation for maritime crew training, the so-called Maritime Education and Training (MET). STCW78 was amended in 1995, giving rise to STCW95. Subsequently, in 2010, a new revision was carried out in which new amendments, called the Manila Amendments (Yabuki, 2011), were adopted, resulting in STCW10. The 2010 amendments came about to cover the shortcomings of the previous conventions. As for the differences between the 1978 version and the 1995 version, the main one was that the initial convention (STCW78) focused on knowledge, while the amended convention (STCW95) referred to practical skills and competencies supported by theoretical knowledge.

The professional skills originally included in the STCW for the training of seafarers are hard skills, which are linked to learning objectives. Specifically, the competencies specific to the Marine Engineering profession are those of Management at the Master's degree, while those of Operation are mainly integrated within Bachelor's degree studies. The IMO establishes a theoretical-practical type of learning for the acquisition of these competences, which, in turn, calls for assessment through simulators (Hontvedt, 2015). In this sense, there are recent works with simulators within these university studies (Costa et al., 2021; Gralak, 2020).

The Manila Amendments added soft skills to the list of skills required for the training of seafarers. There are two new certificates for the seafarer, called "Engine Resource Management" (ERM) and "Bridge Resource Management" (BRM), which entail the completion of a course (called STCW course). This course aims to cover the need to provide greater safety in teamwork, which is performed in the engine room and on the navigation bridge. In this sense, emphasis is placed on the optimal use of human and technological resources available to achieve safe navigation. In addition, it also aims to define the individual tasks and responsibilities of the various team members and the development of situational awareness to prevent individual errors in the engine room and bridge watch.

It is important to point out that both the number and the type of soft skills required depend on (i) the type of navigation and vessel, (ii) the functions performed and (iii) the position held. Vessels are classified according to the type of navigation they perform and according to the nature of the transport they carry out (Table 1). On the one hand, there are two types of navigation: (i) coastal, typical of vessels that necessarily touch port on their voyage; and (ii) oceanic, when they do not necessarily touch port. On the other hand, there are vessels that transport dangerous goods (gas carrier, chemical tanker, and oil tanker) and passenger vessels, dedicated to the transport of passengers.

The crewmembers of dangerous goods vessels must receive specific training in cargo handling and safety measures specific to these vessels. Crewmembers on passenger vessels must also be specifically trained in communication and crowd control, as well as in the safety measures specific to these vessels.

Table 1
Types of vessels according to the type of navigation and the nature of the cargo

Type of navigation	Type of cargo	Vessel
Coastal navigation	Passenger vessel	Fast vessel
		Offshore tug
		Harbor tug
		Ro-Ro
		Ro-PAX
Ocean navigation	Dangerous cargo vessel	Gas carrier
		Chemical tanker
		Oil tanker
	Passenger vessel	General cargo
		Container vessel

Apart from the captain, the chief engineer officer and the junior officer, the crew consists of officers (first, second, and third), both deck and engine and, eventually, students (also deck or engine). Each position on board must have a particular type of training. For example, chief engineer officers and captains must have a Bachelor's or Master's degree in navigation and must have at least two years of experience in navigation. Officers, on the other hand, must have a bachelor's degree and, in the case of first officers, must also have at least one year of experience in navigation. Junior officers do not necessarily have to have an academic qualification, although all crewmembers must have passed IMO courses.

The choice of soft skills is based on the ERM certificate and the Manila Amendments (Yabuki, 2011). Some of the vessel crew skills can be found in the Boostrs report's (2020) classification of the most demanded soft skills in the general working world: (i) Effective communication (oral communication, written communication, body language, active listening); (ii) Organizational skills; (iii) Decision-making (problem solving, analytical skills, initiative, critical thinking, logical thinking, inventiveness); (iv) Teamwork (collaboration, cooperation, empathy, tolerance). In addition to these, the ERM certificate includes three other soft skills: (i) Creativity (imagination, curiosity, research, experimentation); (ii) Leadership (organizational capacity, strategic thinking, delegation, diplomacy, constructive criticism); (iii) Time management (adequate planning of available time, scheduling of activities necessary to achieve objectives). Consequently, this paper analyzes the importance given by vessel crewmembers to the three families of soft skills mentioned -communicative skills, teamwork, and long-range planning skills- in their training process and in the development of their work. The perceptions obtained in this respect are analyzed according to gender, age, and variables related to the maritime activity, such as experience, type of vessel and navigation, and the position occupied on the vessel by the crewmembers.

Review of the Literature

Among the soft skills described in the Bochum Inventory of Personality and Competences (BIP) (Batista-Foguet et al., 2016), the ones just mentioned are those commonly considered in specialized works about vessel crewmembers (Conceição et al., 2017). Other works identify different families of soft skills related to maritime work: adaptability, communication, problem-solving, and teamwork (Chala and Bouranta, 2021); digital skills (Overgård & Smit, 2014); ability to cope with stress and fatigue, or cognitive skills, such as situation awareness and cognitive flexibility (Sedlár, 2022).

Many pedagogical adaptation challenges have arisen for maritime crew training in soft skills that the specialized literature has addressed (Gekara et al., 2011; Sellberg et al., 2019). Some work has pointed out potential contradictions that may exist between crewmember instruction in soft skills and the practice of those soft skills in real sailing environments (Emad & Roth, 2008). In this sense, studies have shown that there are certain gaps between the soft skills developed during crewmember training and those required in their professional development (Van-Belle, 2020).

But the changing factors that characterize the maritime and logistics sector require maritime professionals to have a great capacity to adapt to new situations, communication and learning skills, and to be adequately trained in soft skills (Torre et al., 2019). Therefore, it is necessary to analyze the perception that crewmembers have of the need for soft skills in their professional performance, so that the obtained conclusions can be considered to improve the current training plans. This paper explores the opinion of marine crew about the importance of soft skills in the performance of their responsibilities, differentiating, among other aspects, by the position held and by the type of navigation and vessel of the crewmember.

The preceding literature shows that one of the possible approaches to study the formative implications of soft skills is the correlational analysis based on opinions and assessments expressed by the agents involved in the instruction or learning process (Antón-Sancho et al., 2021). Thus, in this work an analogous approach has been chosen to explore the importance that vessel crewmembers attribute to soft skills that more prominently form part of their training plans. The main objective is to identify the factors that most decisively influence the formation of these opinions, so that the analysis serves as a basis for a future reflection on the training plans and continuing training of vessel crewmembers. In this sense, both the object of study –the formative relevance of soft skills– and the methodology used –the correlational analysis founded on the survey responses– are based on the previous literature, and the main element of originality and novelty is found in the population for which the study is intended –vessel crewmembers–.

METHOD

Participants

Initially, 132 crewmembers of Spanish-flagged vessels belonging to the bridge or engine department were approached. These have been chosen through a non-probabilistic convenience sampling process (Kitchenham and Pfleeger, 2002), because they were among the authors' contacts. The participants were chosen to represent the two main departments of the vessels. They were contacted by email and WhatsApp to inform, get the consent from the study participant, and to distribute the GoogleForm™ survey link. All of them answered an anonymous survey in a voluntary and free manner. After collecting the answers to the survey, 12 of them were discarded for incomplete answers, so that the final number of participants is 120. Within the sample of participants are represented all crew positions, both deck and engine, coastal and ocean navigation, and all possible types of vessels.

Objectives, Variables, and Hypothesis

The present study pursues, as a general objective, to analyze the importance given by vessel crewmembers to communicative and social, teamwork, organizational and decision-making skills, which are the most demanded in the maritime sector, within the scope of their work activity (Conceição et al., 2017). More specifically, it is possible to identify the following specific objectives: (i) to make a statistical analysis of the opinions of vessel crewmembers on the importance of the aforementioned skills; (ii) to identify gaps in such opinions when the sample of participants is differentiated by gender, age, position on board, type of navigation, time of experience, or type of vessel in which the naval activity is developed.

The independent variables of the study (Table 2) delimit the sociological and marine profile of the participants. All of them are nominal variables, some of them dichotomous (gender and type of navigation performed), and others polytomous (age, type of vessel, position held, time of experience in the position, and total time of navigation experience). The values of the variables whose content is temporal (age, time of experience, and time in the position held) have been defined as grouped ranges of years as shown in Table 2.

The age brackets were established according to the minimum retirement age in the merchant navy, which is between 55-57 years depending on the years sailed, and the minimum age at which one can start sailing (24 years for officers as this is the minimum age at which they finish their university studies, or 20 years if they start sailing as junior officers with a non-university degree). The time intervals established for experience in the position are based on the number of years required to move up the ranks. Thus, from student to third or second officer, it takes one year of navigation; from second officer to first officer, it takes another year of navigation. The higher the rank, the longer the time spent in the position. For the total experience, a range of 4 years was established.

The dependent variables (Figure 1) have measured the importance that the participants give, in the development of their work, to the soft skills analyzed in the Boostrs report

(2020) as the most demanded skills in the maritime sector, together with those established in the ERM certificate that all officers on board must have. Specifically, the following soft skills are studied: (i) social skills; (ii) effective communication (oral and written, temporal language and active listening); (iii) decision making (problem solving, initiative, analytical skills, logical and critical thinking, inventiveness, etc.); (iv) teamwork; (v) creativity (imagination, curiosity, research, experimentation); (vi) leadership skills (organizational skills, strategic thinking, delegation, diplomacy, constructive criticism); (vii) time management (adequate planning of available time, scheduling the activities necessary to achieve objectives). These soft skills are grouped into three main families, which define the three dependent variables of the study: (i) communication skills –social skills, effective communication, and decision making–; (ii) team effectiveness –teamwork and creativity–; and (iii) long-range planning skills –leadership skills and time management–. All dependent variables are ordinal discrete quantitative and are measured on a Likert scale from 1 to 5, where 1 indicates the lowest importance and 5 indicates the highest importance (Figure 1).

The main hypothesis that is sought to be contrasted through this research is the following: The type of vessel in which the crewmember carries out his work and the position he/she occupies in it significantly condition his/her perception about the importance of having a solid training in communication skills, team effectiveness, and long-range planning skills. It is intended that the results obtained in this regard serve as a basis for rethinking the specific training plans of the vessel's crew regarding the training on soft skills.

Table 2
Independent variables and percentage of each one

Type of variable	Independent variable	Values	Percentage (%)
Sociological	Gender	Male	85.83
		Female	14.17
	Age	<25 years old	1.67
		25 to 34 years old	28.33
		35 to 44 years old	24.17
		45 to 54 years old	25.83
		≥55 years old	20.00
Naval	Maritime work experience	<2 years	15.00
		2 to 5 years	17.50
		6 to 10 years	10.83
		11 to 15 years	8.33
		16 to 20 years	24.17
		>20 years	24.17
	Position	Deck student (DS)	1.67
		Engine student (ES)	6.67
		Junior officer (JO)	12.50
		Third deck officer (TDO)	2.50
		Third engineering officer (TEO)	5.83
		Second deck officer (SDO)	3.33
		Second engineering officer (SEO)	10.83
		First deck officer (FDO)	9.17
		First engineering officer (FEO)	11.17
		Chief engineer officer (CEO)	20.83
		Captain (C)	15.00
	Experience in the position	<5 years	48.33
		5 to 9 years	8.33
		≥10 years	43.33
	Type of navigation	Coastal	59.17
		Oceanic	40.83
	Type of vessel	Fast vessel (FV)	17.50
		General cargo (GC)	4.17
		Gas Carrier (GasC)	24.17
		Oil tanker (OilT)	8.33
		Chemical tanker (CT)	0.83
		Offshore tug (OT)	10.00
		Harbor tug (HT)	0.83
		Ro-Ro (RR)	3.33
		Ro-PAX (RP)	17.50
		Container vessel (CV)	13.33

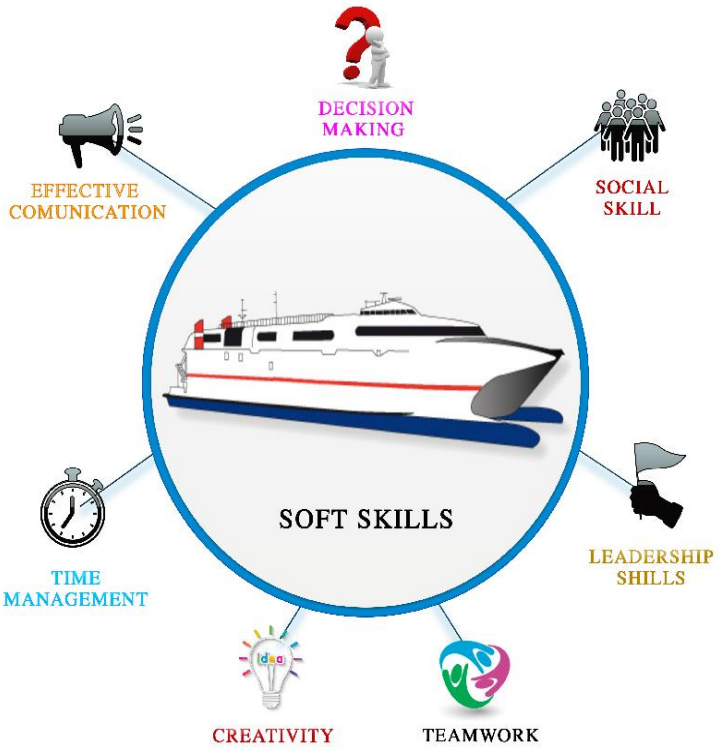

Figure 1
Dependent variables

Instrument

A survey with seven questions, or items, was used, asking participants to assess the importance they give to the aspects that define each of the dependent variables described. The questions are Likert-type, with a range of five answer options, ranging from zero importance (value 1) to extreme importance (value 5).

Procedure

This research is framed within a descriptive quantitative empirical methodology based on the analysis of data from a survey-type instrument, which was passed to the participants in September 2021. After obtaining the answers to the survey and discarding those respondents who provided answers considered invalid for the study (for being incomplete in the presentation of the sociological or maritime profile data or not having answered all the questions posed), the latent factors of the instrument were identified, to confirm the theoretical model of three variables. To this end, an Exploratory Factor Analysis (EFA) was applied to define a set of three subscales that explain the latent factors in the survey with statistical significance. The three subscales correspond to the

three dependent variables that have been defined. The first subscale consists of three items and the other two of two items each. The EFA model was confirmed by Confirmatory Factor Analysis (CFA). In addition, Pearson correlations were obtained for the different subscales among themselves and with respect to the global scale, Cronbach's alpha and composite reliability (CR) parameters, which allowed to conclude that the instrument has good levels of internal consistency, and average variance extracted (AVE), for the analysis of the convergent validation, were also computed.

For the analysis of the results, the overall descriptive statistics of the answers were computed for the different soft skills and subscales defined (mean and standard deviation). The means of the subscales were obtained by differentiating the sample by each of the independent variables, and these means were compared by t-test (for dichotomous variables) or ANOVA test (for polytomous variables). The Lilliefors test was used to verify that the responses are normally distributed. In addition, homoscedasticity, when differenced by each independent variable, was verified with Levene's test. In the only variable for which it is not possible to assume homoscedasticity (vessel type), the ANOVA test was applied with Welch's correction for samples without equality of variances. All tests were performed taking 0.05 as the significance level.

FINDINGS

Analysis of the sample of participants

Participants are not evenly and uniformly distributed when differentiated by the different independent variables (Table 2). In other words, the distribution of participants indicates that none of the independent variables generates a homogeneous distribution of participants. This poses no difficulty for statistical analysis and is simply a reflection of the lack of uniformity by gender, age, experience, and positions held that exists in the actual crewmember population. Males are much more frequent than females and crewmembers of central ages (between 25 and 54 years) are more frequent than those of extreme ages. Those under 25 years old, who are all deck or engine students, are the least frequent. Approximately half of the participants have more than 15 years of crew experience. In terms of experience in the current position, the participants are roughly evenly distributed between those with less than 5 years and those with more than 10 years. The most frequent positions are the hierarchically higher positions (master and chief engineer, between them comprising slightly more than 35% of the participants) and the most frequent vessels are the gas carrier, followed by the Ro-PAX and the fast vessel.

Factor analysis, consistency, and convergent validity of the instrument

Table 3 shows the factor weights of the EFA, carried out with Varimax rotation, which were higher for each item of the survey. As can be observed, it is necessary to consider three factors to explain the answers to the survey (chi-square = 6.92; df = 3; p-value = 0.0746). The internal consistency of the subscales is high, as evidenced by the Cronbach's alpha and CR parameters shown in Table 3. The convergent validity analysis is performed by means of the AVE values, which are adequate (Table 3).

Table 3
EFA factor weights

	Factor 1. Communicative skills	Factor 2. Team effectiveness	Factor 3. Long-range planning skills	Cronbach's alpha	CR	AVE
Effective commun.	0.976			0.7133	0.6941	0.5318
Decision making	0.511					
Social skills	0.513					
Leadership skills		0.898		0.7025	0.6906	0.5196
Teamwork		0.528				
Creativity			0.683	0.7276	0.7139	0.6255
Time management			0.592			

Table 4 shows that the EFA model explains 57.7% of the variance. The three variables encompassed in factor 1 are competencies of the communicative type (Riggio, 2003), those in factor 2 are competencies characteristic of effective teamwork (Kozlowski et al., 2015; Paolucci et al., 2018) and those in factor 3 are competencies characteristic of long-term project development (Zampetakis et al., 2010). According to Cortina (1993), the internal consistency of the three scales is adequate (Table 3) since Cronbach's alpha parameters are higher than 0.7.

Pearson's coefficients (Table 5) show that the paired correlations established between the different subscales are low, but there is a moderate-high correlation of each of the subscales with respect to the global scale. This means that there is a low degree of dependence between the different subscales, but a moderate dependence of the subscales on the total scale. All correlations are statistically significant ($p<0.05$). This observation concludes the psychometric validation of the survey.

Table 4
Cumulative proportion of explained variance of the principal component analysis

	Communicative skills	Team effectiveness	Long-range planning skills
Prop. of variance	0.220	0.184	0.173
Cummulative of var.	0.220	0.404	0.577

Table 5
Pearson correlations between the different subscales and between each one of them and the global scale

	Factor 1	Factor 2	Factor 3	Global
Factor 1	1	0.3322	0.3317	0.7533
Factor 2		1	0.2818	0.7068
Factor 3			1	0.7501
Global				1

Analysis of the responses

The overall results of the survey (Table 6) show that the most valued skills are teamwork and decision making, followed by time management and leadership skills. These skills are also the ones with the lowest standard deviations, which means that the participants show agreement and clarity of ideas in this regard. Creativity is the skill that

is least valued at the average level, although it achieves an intermediate-high value (3.80 out of 5). It is also the skill with the highest standard deviation, i.e., it is the one in which the participants are most insecure and give more heterogeneous responses.

The results distinguishing by the soft skills subscales defined in the EFA (Table 7) show that the team effectiveness subscale is the most highly valued among the participants and, moreover, is the one that elicits the greatest homogeneity in the answers, since it is the one with the smallest deviation. This fact indicates that the opinion on this matter is solidly formed among the survey respondents. In second place, the participants ranked communicative skills, to which they gave slightly less importance, at a medium level, than teamworking, but with a very similar and, in both cases, high level of homogeneity. The long-range planning skills subscale was perceived as the least important of the proposed subscales, although in this case the deviation was slightly higher than in the previous ones (around one tenth). In fact, this variable is the one that shows the greatest variation in comparison with the communication skills and team effectiveness variables (Table 7). This suggests a greater weakness in the formation of the corresponding concepts. In addition, it can be assumed with statistical significance, from the Lilliefors test, that the responses of the three variables considered are normally distributed (Table 7). Within each subscale, the soft skills that have obtained the highest valuation are: (i) decision-making, in the communication skills subscale; (ii) teamwork, within the team effectiveness subscale; and (iii) time management, within the long-range planning skills subscale. In all three cases, the most highly valued soft skill is also the one with the lowest deviation within the corresponding subscale.

Table 6
Global results of each analyzed soft skill

	Mean	Standard deviation	Coefficient of variation (%)
Effective communication	4.15	0.72	17.29
Decision making	4.38	0.61	13.93
Social skills	3.91	0.79	20.18
Leadership skills	4.23	0.74	17.48
Teamwork	4.43	0.66	14.83
Creativity	3.80	0.90	23.78
Time management	4.27	0.62	14.49

Table 7
Global descriptive results of the subscales and statistics of the Lilliefors normality test

	Mean	Standard deviation	Coefficient of variation (%)	Lilliefors D	Lilliefors *p*-value
Communication skills	4.15	0.73	17.59	0.2290	0.1617
Team effectiveness	4.33	0.71	16.40	0.1187	0.9812
Long-range planning skills	4.03	0.81	20.01	0.2036	0.2142

When participants are differentiated by sociological variables (gender and age), parametric tests of mean comparison (t-test and ANOVA, respectively) only detect

significant gaps in the mean values for the team effectiveness subscale when differentiated by gender (t = 3.1421; p-value = 0.0027). For this subscale, females give significantly higher importance assessments than males at the mean level (4.62 over 5 for females vs. 4.28 over 5 for males). In the rest of the subscales, there are no significant differences by gender. In all subscales, Levene's test shows homoscedasticity for both gender and age, i.e., it can be assumed that there are no significant differences between the deviations. With respect to the maritime content variables, ((i) time of experience, (ii) time in current position and (iii) type of navigation) these are not discriminative variables for the subscales studied, i.e., the results do not show statistically significant gaps between the mean answers when differentiated by any of these variables. On the other hand, the position held and the type of vessel are discriminative variables.

Regarding the answers differentiated by position held (Tables 8 and 9), the Levene test indicates homoscedasticity for all subscales (F = 0.8048, p = 0.6242 for communication skills; F = 0.6176, p = 0.7982 for team effectiveness; and F = 0.9702, p = 0.4702 for long-range planning skills), and the ANOVA test shows that this variable significantly influences the mean answers of the communication skills (F = 2.6481; p = 0.0086) and long-range planning skills (F = 2.0464; p = 0.0313) subscales. Communication skills are most highly valued by deck students, third and first officers and the chief engineer officer. On the other hand, the lowest assessments are provided by the engine students, second officers and captains. In general, the deck crew gives less importance to communication skills than the engine crew. As for the long-range planning skills subscale, the highest valuations are given by deck students and first officers. The captains and second officers give less importance to this family of skills.

The ANOVA test statistics indicate that the variable measuring vessel type generates significant differences in the mean answers for the communication skills (F = 2.4630; p = 0.0099) and team effectiveness (F = 2.0250, p = 0.0375) subscales. For the two subscales, the ANOVA test is applied with Welch's correction without assuming equality of variances, because the Levene test statistics do not allow to assume homoscedasticity (F = 4.7671; p = 0.0000 for communication skills and F = 3.9948; p = 0.0001 for team effectiveness). From Table 10 it can be deduced that the highest valuation of communication skills is obtained from chemical tanker, RoPAX and Ro-Ro crews and the lowest rating is obtained from general cargo and offshore and harbor tugs. As for the team effectiveness subscale, the highest rating is achieved by the Ro-Ro. The lowest assessments are for the general cargo, chemical tanker, and offshore tug. General cargo is the vessel in which there is the greatest dispersion in the responses for both communication skills and team effectiveness, suggesting that it is the vessel in which there is the least consensus in the self-perceptions expressed (Table 11). On the other hand, chemical tanker, harbor tug, and Ro-Ro crewmembers show the least deviating responses, which in some cases correspond to zero deviation. Therefore, it can be assumed that their crew is the one with the greatest consensus on the two variables considered (Table 11).

Table 8
Mean responses when differentiated by position held for the communication skills and long-range planning skills subscales

	DS	ES	JO	TDO	TEO	SDO	SEO	FDO	FEO	CEO	C
Comm. skills	4.67	4.00	4.09	4.22	4.33	3.42	4.05	4.30	4.40	4.24	3.93
Long-range plan. skills	4.50	4.06	4.27	3.83	4.07	4.00	3.50	4.32	4.29	4.08	3.75

Table 9
Standard deviations of the responses when differentiated by position held for the communication skills and long-range planning skills subscales

	DS	ES	JO	TDO	TEO	SDO	SEO	FDO	FEO	CEO	C
Comm. skills	0.52	0.78	0.70	0.67	0.73	1.24	0.69	0.64	0.54	0.67	0.77
Long-range plan. skills	1.00	0.77	0.74	0.41	0.73	0.93	1.03	0.72	0.71	0.67	0.84

Table 10
Mean responses when differentiated by type of vessel for the communication skills and team effectiveness subscales

	FV	GC	GasC	OilT	CT	OT	HT	RR	RP	CV
Communication skills	4.17	3.60	4.10	4.10	4.67	3.97	4.00	4.67	4.30	4.17
Team effectiveness	4.38	3.70	4.26	4.35	4.00	4.29	4.00	5.00	4.38	4.41

Table 11
Standard deviations of the responses when differentiated by type of vessel for the communication skills and team effectiveness subscales

	FV	GC	GasC	OilT	CT	OT	HT	RR	RP	CV
Communication skills	0.70	1.45	0.65	0.66	0.58	0.83	0.00	0.49	0.56	0.70
Team effectiveness	0.63	1.42	0.71	0.67	0.00	0.61	0.00	0.00	0.58	0.75

DISCUSSION

General Discussion

In this work, an instrument has been designed and validated to measure the evaluation given by vessel crewmembers of the different work skills that affect their work. A factor analysis of this instrument has made it possible to distinguish the scales of communication skills, team effectiveness and long-range planning skills. The results show a high overall rating on all three scales, especially on the team effectiveness scale. The high valuation of teamwork may be caused by the long periods of time the crew spends together. This is in line with the importance given in the literature to competency development in the maritime profession (Medvedev, 2017). It also proves the existence of a gender gap for the team effectiveness scale in favor of females. This may be because females, still being a minority in the maritime world, particularly value being integrated in a work group, although this requires verification. Likewise, it has been found that deck students are the ones who have the highest regard for communicative

skills and long-range planning skills. This seems reasonable, because of the necessary communication that students must have with their superiors due to their status as trainees. In addition, the Ro-Ro crewmembers are the ones who give the highest value to communication skills and team effectiveness.

Theoretical Implications

It is important to notice that sailing experience does not significantly influence the opinion about soft skills in the maritime world. This agrees with other related studies. In Overgård & Smit (2014), for example, it is shown that sailing experience on vessels does not induce significant differences in crewmembers' digital skills. In the present work, although focused on soft skills, an analogous conclusion is obtained. This seems very specific to the field of navigation, because analogous studies conducted on populations from different professional fields (e.g., university professors) show that professional experience influences the valuation of an important set of soft skills (Antón-Sancho et al., 2021; Fernández-Arias et al., 2021).

However, the position held significantly influences the perception of communication skills and long-range planning skills. In this sense, captains are the ones who give the lowest value to both families of skills, while deck students are the ones who consider them the most important. The type of vessel, on the other hand, influences the perception of communication skills and teamwork skills, but it is not possible to conclude that the type of navigation or the type of cargo are significantly influential. Ro-Ro and chemical tanker crewmembers value communication skills the most, while team effectiveness is most valued by container vessel crewmembers. In both skill families, gas carrier crewmembers rate them the lowest.

IMPLICATIONS

The results suggest that the vessel's commanders give less importance to communications skills than the rest of the crew. Probably, the fact of having to carry out orders causes a higher sensitivity to communicative skills. It is recommended, therefore, that ongoing training sessions be designed for the commanders on the development of communication skills in the exercise of their responsibilities and the development of communication skills. This suggestion is coherent with the results shown in the literature regarding employee training, since this type of group and communication training actions are, in general, welcomed with satisfaction and motivation by the employees (Barattucci et al., 2018).

LIMITATIONS

The identification of the reasons for the differences in the assessment of communicative skills between ship's commanders and the rest of the crew cannot be derived from the results, so it is a limitation of the study. A specific analysis of the factors that explain them, within the activity of these crew members, is proposed as a future line of research.

The specific activity of each type of vessel has been shown to influence crewmembers' perceptions of the importance of communication skills and team effectiveness. Again, the identification of the factors causing these differences is a limitation of this work and

an interesting line of future research. This identification would help, in any case, for the design of the training sessions that have been recommended, and it is suggested that they be specific for each type of vessel.

In addition to those indicated, a limitation of this research is the size of the sample, which derives from the very specific population to which the work is intended. It is suggested to expand the sample and the objectives of the study, to compare the results with those of crewmembers from other geographical regions. In this way, it could be identified if there is a discriminating geographic variable of the expressed opinions.

The sample has a large majority of males. This imbalance is probably caused by the low frequency of females within the vessels' crews. The fact that it is precisely women who attach greater importance to teamworking may have to do with their minority status within their work teams, but a specific study would be necessary to confirm this. It would also be useful to look more closely at the specific characteristics of the different positions within the crew and of the various vessels that account for the differences found in the assessments under study. All these aspects are lines of future research.

CONCLUSION

Crewmembers on vessels of both types of navigation and whatever position they occupy, highly value soft skills in the performance of their work. The valuation of the different families of soft skills depends on certain sociological and naval aspects. The opinions on the relevance of communication skills, long-range planning and teamwork skills depend strongly on the professional development of the crewmembers according to the position they occupy, and the type of vessel they work on. Consequently, it is suggested that training plans for vessel crewmembers should consider these differences and that specific training courses on soft skills should be designed for the different positions that can be occupied, addressing the specific professional needs of each position.

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