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QUALITY CRITERIA IN MARITIME EDUCATION AND TRAINING

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ABSTRACT

It is crucial to implement quality standards systems to achieve and maintain the educational and training requirements in the maritime field stipulated by the International Maritime Organization and Standards of Training, Certification and Watchkeeping Convention and Code. In the study, the quality criteria for maritime education were determined and examined. For this purpose, in line with the literature review and expert opinions, 38 sub-criteria were determined under five main criteria, and these criteria were prioritised using the Best Worst Method through the agency of 10 experts. The results of the study showed that the most fundamental criteria in the quality of maritime education and training are professional and personal development, sense of professional ethics, publication and research, and compliance with and effective use of course hours, respectively. The results of the study have also enabled educational institutions to evaluate their strengths and weaknesses in terms of quality.

Keywords: *Maritime, Education, Training, Quality, Best Worst Method*

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DENİZCİLİK EĞİTİM VE ÖĞRETİMİNDE KALİTE KRİTERLERİ

ÖZ

Uluslararası Denizcilik Örgütü ve Gemiadamlarının Eğitim, Belgelendirme ve Vardiya Tutma Standartları Hakkında Sözleşme ve Kodu'nun öngördüğü denizcilik eğitim öğretim gereklerine ulaşmak ve sürdürebilmek için kalite standartları sistemlerinin uygulanması son derece önemlidir. Çalışmada denizcilik eğitimi için kalite ölçütleri belirlenmiş ve irdelenmiştir. Bu amaçla yapılan literatür taraması ve uzman görüşleri doğrultusunda 5 ana kriter altında 38 alt kriter belirlenmiş ve 10 uzmanın yardımıyla En İyi-En Kötü Metodu kullanılarak kriterlerin önem sıralaması yapılmıştır. Sonuçlar denizcilik eğitim ve öğretiminin kalitesinde en önemli ölçütlerin sırasıyla, akademik personel ve danışmanlık hizmetleri ana başlığı altında bulunan mesleki ve kişisel gelişim, meslek etiği anlayışı, yayın ve araştırma yapılması ve ders saatlerine uyum ve etkin kullanım olduğunu göstermiştir. Çalışma sonuçları aynı zamanda eğitim kurumlarının kalite için güçlü ve zayıf yanlarını değerlendirebilmelerini sağlamaktadır.

***Anahtar Kelimeler**: Denizcilik, Eğitim, Öğretim, Kalite, En İyi-En Kötü Metodu*

1. INTRODUCTION

The maritime domain is the practical application of interdisciplinary knowledge with a cultural background, encompassing not only physical operations but also economics, human resources, politics, coastal management, law, international standards and regulations (Shah et al. 2007). The participation of developing countries in the global economy has contributed to a rapid increase in the maritime sector, which is the most important transport mode in international trade (Toygar et al. 2022). 774,000 officers, 873,500 crew members, and a total of 1,647,500 seafarers work together to meet global economy's demands (International Chamber of Shipping, 2020). These changes in global economy demands have caused the increase in marine accidents. Approximately 20,000 marine accidents were reported within only 5 years (EMSA, 2020). When marine accidents in the history of the maritime field are examined, studies focusing on the causes of accidents have revealed that human-related errors are the most important factors in marine accidents, with a percentage of 70-90 (Erol and Başar, 2015; Altinpinar and Başar, 2018). The analysis of the human errors giving rise to many maritime accidents has shown that factors such as seafarers' weaknesses in decision-making and their lack of knowledge are the prominent aspects in paving the way for human errors (Chauvin et al. 2013; Yıldırım et al. 2019). In addition,

the poor working conditions of the maritime profession negatively affect the physical and mental health of the seafarers and cause reduction of decision-making abilities (Yıldırım et al. 2021, Kınalı et al. 2022). According to scientific research and reports on maritime accidents, unqualified crew members and insufficient education both have a significant role in giving rise to accidents; thus, improving educational standards, all by itself, will undoubtedly be one of the essential measures in reducing maritime accidents on its own (Barnett, 2005; IMO, 2011).

There are over 20,000 higher education institutions worldwide (World Higher Education Database, 2020). The United Nations (UN) (2020) has included quality education among its priority targets within the scope of its sustainable development goals. The United Nations considers quality education that promotes inclusive lifelong learning for all as the ultimate goal of education. According to The United Nations Educational, Scientific and Cultural Organization (UNESCO, 2020), factors such as a lack of learning materials and qualified teachers, poor foundations for learning, receiving education in areas out of abilities, language barriers, and ineffective systems to evaluate students' performance are among the main barriers to quality education. The International Maritime Organization (IMO), an affiliated body of the United Nations, founded the World Maritime University (WMU) to support and encourage quality education, and this higher education institution aims to train individuals who guide the maritime sector and contribute to the improvement of the quality of maritime education. The IMO standardized the training for seafarers with the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW Convention) all over the world and set the quality standards for maritime training with STCW Code Parts A I/8 and B I/8. In addition to the compliance with the STCW Agreement, it is also recommended that educational institutions be certified by internationally accepted quality management systems such as ISO 9001 and carry out their activities in this direction.

There are studies on maritime education and training in marine literature (Evangelista and Morvillo, 1998; Lewarn, 2002; Cooper et al. 2003; Carp, 2004; Paine-Clemes, 2006; Shah et al. 2007; Emad and Roth, 2008). However, this study aims to evaluate all aspects of maritime education within the scope of quality objectives. For this purpose, the quality criteria in maritime education were determined in line with an extensive literature review and a survey of academicians. Criteria weights were calculated with the Best-Worst method, based on the opinions of the expert group of 10 academicians.

The Best-Worst Method (BWM) by Rezaei (2015), is used for weighting the criteria by reducing the number of the necessary comparisons. This method results in a higher consistency rate compared to similar procedures, making its output more reliable. For this reason, the BWM is popular in various different scientific fields (e.g. Gupta and Barua, 2016; Ren et al. 2017; Salimi and Rezaei, 2018) and was chosen to be the methodology for this study. The aim of this study is to determine the quality criteria and their importance in maritime education in order to plan the needs of the students, academicians, and investments. The study also enables institutions to become aware of their weaknesses and strengths for quality education.

2. LITERATURE

2.1. Quality and Quality in Education

Quality is the sum of all the features and a product or service that reveals its capability to satisfy the given needs (EOQC, 2020; Kharub and Sharma, 2020). It is quite complex to define quality or to find a single accepted definition for quality in the field of higher education (Oblinger et al. 2001: 19; Hamalainen, 2003: 292; ENQA, 2005: 10). For example, Harvey and Green (1993) define quality for higher education using five complementary approaches. These five quality concepts are as follows: exceptional quality, perfection (or consistency), quality as fit for purpose, quality as economic value, and quality as conversion. The Quality Assurance Agency (2002) in the UK, on the other hand, groups the factors affecting quality in education under six categories which are curriculum, teaching, learning and evaluation, student development and success, student guidance and counselling services, and learning resources and management. Owlia and Aspinwall (1996) classify quality elements in higher education into some sub-headings and emphasize that the quality of education is of critical importance, particularly for students, academic staff, and employees. Quality indicators in higher education are associated with instructional-administrative environments and physical-technological environments (Stukalina, 2010).

On the other hand, quality in higher education denotes the quality of a given service, unlike the quality of a manufactured product. Service quality, which has gradually emerged in higher education (Tan and Simpson, 2008), has attracted attention in the last two decades (Jelena, 2010). Quality cannot be seen, touched or felt like a final product in higher education. Besides, it has a structure that can vary from class to class, teacher to teacher, and student to student (Dotchin and Oakland,

1994; Ghobadian et al. 1994; Owlia and Aspinwall, 1996). In this context, quality in higher education is a comprehensive concept consisting of all laws, processes, activities and mechanisms that will ensure, maintain, and improve quality in higher education (Glanville, 2006).

Quality includes all the planned, systematic technical requirements and studies that guarantee the protection and improvement of teaching standards, science and quality in higher education (Stephenson, 2012). Two approaches are defined to ensure quality assurance in higher education. One of them is accreditation, and the other is the assessment of the outputs (graduates) (Van Berkel and Wynand, 2010). It is well-known that the longer the student's graduation period, the higher the cost of quality (Vinichenko et al. 2016; Finch et al. 2016).

Quality encompasses a systematic review of educational processes to increase educational institutions' quality and efficiency (European Commission, 2018). Higher education institutions are included in the quality assurance process for reasons such as improving the management, education and research-development activities of the institution continuously, meeting the workforce expected by the market, associating the learning outcomes with the mission, vision, and purpose, revealing the organizational management scheme required for academic programs clearly, transparency, traceability, and determining measurable criteria in terms of accountability, making decisions that will benefit all stakeholders that can be addressed under the headings of students, academicians and managers (ESG, 2015; ESU, 2017; ENQA, 2018). Stephenson (2012) states that one of the main factors for raising professionally qualified students is ensuring the quality of education so that the goals set for the students and the acquisition of necessary skills depend not only on the management but also on the learning environment and opportunities, the students' level of skills and educational counsellors, and in general, on the availability of good educational services.

2.2. Maritime Education

The maritime industry has paid attention to maritime education and training, especially since the 21st century (Cunningham, 2015). Yamamoto (2002) states that the most important values in today's maritime field are safety, quality, and environment. According to Haun (2014), adopting a pedagogical approach to maritime education and training will provide useful knowledge and skills for maritime industries and academic institutions. Cunningham (2015) found out that the lack of

maritime education and awareness in academic institutions is one of the factors that result in the abandonment of proficiency and profession. It is essential that seafarers receive quality training to be able to manage risks, solve problems and ensure clean and efficient operations for the safety of life at sea. Research has made significant contributions to the literature on maritime education and training regarding the skills required for the maritime workers and the structure of maritime courses (Gardner et al. 2007; Ng et al. 2011). Taussik (1998) emphasizes that interdisciplinary education and training in the maritime sector is critical for maritime stakeholders. Barnett et al. (2006) have contributed to these initiatives by identifying seafarers' needs in the marine and coastal-based sectors, mapping existing career opportunities, and maritime training. Shah et al. (2007) have outlined a specific template for courses that require a delicate balance between academic and professional relevance in maritime education. Maritime education and training are a unique blend of full-time higher education and internship (Tanggaard, 2005). In addition, due to the nature of the industry and the workplace, a maritime career, in general terms, is mainly dependent on a delicate balance between individual expectations and prevailing professional realities (Dinwoodie, 2000). An essential factor that should be taken into consideration is that the nature of the internship training is completely employer-led, while the full-time education component is led by the institution (Shaw and McAndrew, 2008).

The maritime industry offers a unique example of globalization in the labour market, so seafarers are increasingly recruited from an open global labour market and work globally in mobile workplaces in multinational crew environments (Wu, 2004). Inevitably, in this educational setting, many of the processes within the institution are heavily influenced by the employment and training policies adopted by the shipping companies (Dinwoodie, 2000). On the other hand, some researchers have emphasized that the increasing complexity of the contemporary maritime industry triggers the need to formalize and standardize education (Grewal and Haugstetter, 2007). Higher education institutions, particularly those in Asia and Europe, offer undergraduate and postgraduate programs that contribute to the professionalization of maritime industries (Adolf et al., 2009). Professional competence can only be achieved by applying academic knowledge to solve problems, that is, by bridging scientific knowledge and practical performance (Tobias, 2003). Knowledge, onboard experience and the resulting basic skills are essential for a career in the maritime field (Theotokas, 2007). Shipping, particularly, considers the skills, knowledge, and willingness of former seafarers as a contribution to their efficient operations (Gardner et al. 2007). Although the details of the maritime programs vary, they often

serve common purposes, such as enhancing the 'professional' image of the maritime industries (Pallis and Adolf, 2011).

2.3. Quality Criteria in Maritime Education

In the study, the criteria were determined by the literature review and the expert group. Regarding quality in maritime education, Table 1 below shows the main criteria, which are management and administrative staff (MA), student services (SS), education (ED), physical conditions (PC) and academic staff and counselling (AS) and the 38 sub-criteria of these, with explanations for each one, respectively.

The quality dimensions determined in the studies for the quality perception of Management and Administrative Staff are as follows:

1. Competence of managers (MA1): Having the qualifications, competencies, and managerial skills required by the managers' positions and professions

2. Communication of managers (MA2): Managers should be fair and impartial towards students and be sensitive to their wishes, suggestions and complaints by establishing good, clear, open, understanding, and understandable communication in human relations

3. Leadership of the management (MA3): The management guides the students in their personal development, guides them in their future planning and guides the students by explaining the process they need to follow to make progress on this path

4. Quality policy of the management (MA4): Determined, clear, understandable goals in accordance with national and international rules and standards, and efforts to achieve the quality policy, vision and mission goals of the institution by making plans in this direction.

5. Technical and administrative staff (MA5): Sufficient number of technical and administrative personnel on duty to ensure that the education and training process in the institution continues smoothly

6. Entrance criteria for the educational institution (MA6): A general examination that determines the academic competence of the student, a physical proficiency test to determine the physical

strength levels required by the maritime profession, relevant interviews and age limit

7. Qualification of the educational institution (MA7): Training permissions approved by the authorized institutions that indicate that the institution meets the national and international requirements required to provide maritime training have an approved accreditation and a quality management system

8. The support of the university administration to the department (MA8): Updating the equipment used in education, obtaining new simulation and training materials in line with developing technologies and ensuring the employment of lecturers

The quality dimensions determined in the studies on the perception of the quality of services offered to students are as follows:

1. National or international exchange programs (SS1): Providing student exchange programs and cooperating with more than one institution for these programs, including Mevlana, Farabi, Erasmus, etc., which enable students to improve their educational levels and themselves

2. Foreign language development (SS2): Providing preparatory classes, foreign language courses and foreign language seminars for students' foreign language development, which is one of the sector's basic requirements

3. Opportunities for personal development (SS3): Organizing clubs, trips, conferences and seminars to ensure the personal and social development of the students as well as the educational contribution

4. Students information system (SS4): Having a system where the students can access services and information such as course enrolment, success, course attendance, dismissal, and student transactions

5. Accessible structure (Course information package, presentations, resources) (SS5): Having a system where the students can access educational contents, course schedules, exam programs and announcements related to the department

6. Activities for career development (SS6): Conducting joint activities with alumni, maritime companies, port authorities and other authorities that enable students to gain knowledge about the sector.

7. Support for maritime internships (SS7): Organizing sector invitations, career days for sea internships, enabling students to meet with maritime company officials and supporting students in completing their education.

8. Scholarship opportunities of the educational institution, support for social activities (SS8): Scholarship support to students who are successful within the institution and students with economic difficulties, providing part-time job opportunities.

The quality dimensions determined in the studies on the perception towards the quality of education are as follows:

1. Curriculum of the courses and their up-to-dateness (ED1): The course curriculum should be shaped and updated according to STCW rules, IMO Model Courses and criteria set by local authorities, responding to the sector's needs and according to developments/changes

2. Qualification of the exams (ED2): The exams are prepared based on learning outcomes which assess the students' knowledge in proper durations, classes and scope by measuring their knowledge, interpretation and analytical thinking abilities

3. Language of instruction (30-100%) (ED3): The language of instruction is entirely or partially English, helping students to develop their foreign languages, allowing them to take a more active role in the sector, and showing the quality of the institution's outputs (graduates)

4. In-service (mariner) lecturer (ED4): The faculty members who teach vocational courses must be graduates of the relevant department and have field experience, transferring professional knowledge to students as well as theoretical knowledge

5. Diversity of faculty members in courses (ED5): Taking courses from different lecturers, students learning professional knowledge, personal experiences and ideas of faculty members, acquiring different perspectives

6. Contribution of the courses to the research ability (ED6): Not only by giving theoretical knowledge but also by improving students' thinking, questioning and research abilities, presentations, homework, projects, etc. to increase their learning abilities

7. Educational equipment and materials (ED7): The availability of essential maritime education equipment, adequate maritime equipment and materials for students to be familiar with ship conditions, ship materials and to learn the intended use of equipment and materials on board

8. The tracking of internship/workplace training (ED8): Supporting the internship process, providing student-company communication, choosing companies, evaluating / interview processes, and following up processes by communicating with consultants.

The quality dimensions determined in the research regarding the perception of the quality of physical conditions are as follows:

1. Quotas (PC1): The number of quotas recommended in IMO and national guidelines

2. Adequate classroom and foundation (PC2): suitable for the number of students, heating, cleaning, ventilation, lighting, etc. classes and foundations that meet the criteria are sufficient

3. Social life and accommodation facilities (PC3): Opportunities for suitable living areas where students can meet their resting and daily needs, such as cafeterias, dining halls and dormitories, hostels for accommodation etc.

4. Student communication facilities (PC4): The use of internet sites, announcements, boards, social media, etc. that provide mutual communication between the university and the student

5. The location of the educational institution (PC5): The distance of the institution from the central settlements, easy and economical transportation opportunities due to its location

6. Simulation and laboratories (PC6): Having training laboratories, equipment and simulation systems in accordance with STCW standards and regulations

7. Library facilities (PC7): Especially the university, faculty and department libraries are at a sufficient level in terms of accessing the scientific literature in the field of education.

8. Use of alternative technologies (PC8): In addition to using traditional materials and systems in education, integrating up-to-date technologies into the educational infrastructure by using alternative technologies such as VR, Artificial Intelligence, Robotics, Smart Ship, AR, etc. to increase the quality of education.

The quality dimensions determined in the studies on the perception of academic staff and consultancy quality are as follows:

1. Consultancy services (AS1): The monitoring of the educational processes of the students by the academic staff as they are consultants, who should support them in constant communication and provide them with consultancy services

2. Compliance and effective use of class hours (AS2): Academic staff complying with the beginning of the course hours, planning to use the course hours effectively and efficiently, actively using simulations and laboratories

3. Professional and personal development (AS3): Participation of academic staff in seminars, conferences and trainings in order to improve themselves professionally and personally, to follow the ever-evolving and updated contracts and rules of maritime

4. Publications and research (AS4): Academic staff preparing publications by conducting scientific studies and research for the development of the sector in line with the mission and vision of the institution

5. Performance evaluation (AS5): The use of benchmark materials such as surveys, interviews, meetings etc., for the evaluation of the academic staff and the insurance that this system is active, transparent and impartial

6. Understanding of professional ethics (AS6): The academic staff having the mission, vision, reliability, consistency, impartiality, and ideals for their students to ensure the sustainability of continuous contribution and productivity to their students.

Table 1: Hierarchy

Main and Sub Criteria	
Management and Administrative Staff	**Codes**
Competence of managers	MA1
Communication of managers	MA2
Leadership of the management	MA3
Quality Policy of Management	MA4
Technical and administrative staff	MA5
Entrance criteria for the educational institution	MA6
Competence of the educational institution	MA7
Support of university administration to the department	MA8
Services Offered to the Students	**Codes**
National or international exchange programs	SS1
Foreign language development	SS2
Opportunities for personal development	SS3
Student information system	SS4
Accessible structure (Course information package etc.)	SS5
Activities for career development	SS6
Support for maritime internships	SS7
Scholarship opportunities, social activities	SS8
Education	**Codes**
Course curriculum and their up-to-dateness	ED1
Qualification of the exams	ED2
Language of instruction (%30-100)	ED3
In-service (Seafarer) lecturer	ED4
Diversity of faculty members in courses	ED5
Contribution of the courses to the research ability	ED6
Educational equipment and materials	ED7
Tracking of internship / workplace training	ED8
Physical Conditions	**Codes**
Quota	PC1
Adequate classrooms and foundation	PC2
Social life and accommodation opportunities	PC3
Student communication facilities	PC4
Location of the educational institution	PC5
Simulation and laboratories	PC6
Library facilities	PC7
Use of alternative technologies	PC8
Academic Staff and Consultancy	**Codes**
Consultancy services	AS1
Compliance and effective use of class hours	AS2
Professional and personal development	AS3
Publishing and Research	AS4
Performance evaluation	AS5
Understanding of professional ethics	AS6

3. METHODOLOGY

3.1. Best Worst Method (BWM)

The Best-Worst Method is one of the new multiple criteria decision methods (MCDM) and introduced by Rezaei (2015). In his article, Rezaei (2015) weighted the mobile phone selection criteria with BWM method and compared the results with Analytic Hierarchy Process (AHP).

The BWM more efficient method compared to AHP, it has a few interesting features. It structures the problem by first selecting the best and the worst criteria and then comparing these two criteria with all other criteria. This type of structure helps Decision Maker (DM) provide more reliable paired comparisons. Moreover, the specific structure of the BWM leads to two vectors containing only integers and avoids a fundamental distance problem associated with the use of fractions in paired comparisons. The BWM is a multi-criteria decision-making method that finds the optimum weights of a series of criteria based on a single decision-maker's preferences (Rezaei, 2016). There are several studies in which different ways for group decision-making with the BWM are proposed. However, neither of them has suggested a way to find the overall weights of the group in a probabilistic setting. In our study, the arithmetic mean operator was used to obtain a common weight vector by bringing together decision-makers' individual priorities.

The Best-Worst Method was used in evaluating the social sustainability of supply chains (Ahmadi et al. 2017), in oil and gas supply chain (Ahmad et al. 2017), in tourism sector (Çakır and Can, 2019), in the selection of enterprise resource planning systems (Aşan and Ayçin, 2020) and in the personnel selection process (Arsu and Arsu, 2021).

4. ANALYSIS AND RESULTS

The current study aims to determine the quality criteria, degrees of the importance and development steps in maritime education and to plan the needs and investments of students and academicians in this context. For this purpose, the criteria were determined through an in-depth literature review and the guidance of the expert group, and the importance levels of the criteria were calculated using the BWM method with the questionnaires made with the expert group. 38 sub-criteria have been determined under five main criteria for quality in maritime education. An expert group of 10 academicians was set up to rank the quality criteria. The characteristics of the expert group are presented in

Table 3. While determining the expert group, people from all academic and proficiency levels were selected. 4 people from the expert group are faculty members who have received Quality Standards Auditor Training and are authorized by the Administration to inspect maritime education institutions. Non-marine lecturers teach Leadership and Human Resources Management, Safety and Quality at the undergraduate level.

Table 3: Characteristics of the Expert Group

No	Academic Title	Academic Service	Qualification	Maritime Service	Certificate of Quality Standards Training/Auditor
1	Prof.Dr.	25	Master	6	✓
2	Assoc.Dr.	10	Unlimited Chief Off.	4	-
3	Assoc.Dr.	15	-	-	✓
4	Dr. Lecturer	11	Unlimited Master	10	✓
5	Dr. Lecturer	7	Unlimited Master	9	-
6	Lecturer	5	Unlimited Master	8	-
7	Lecturer	5	Unlimited Chief Off.	4	✓
8	Lecturer	3	-	-	-
9	Res.Assist.	3	Unlimited Chief Off.	4	-
10	Res.Assist.	2	Unlimited Watch. Off.	2	-

In the BWM application, firstly, each expert determines the main criteria and then the most important and least important criterion among the sub-criteria groups. Afterwards, the comparison is made by determining the degree of superiority of the most important criterion to the other criteria on the 1-9 scale and determining the degree of superiority of the other criteria to the least important criterion. Table 4 shows that AS, which is the most important main criterion, is eight times more important than the other main criteria, ED. Similarly, the comparison of other main criteria with the least important main criterion is made in Table 5. The criteria weights obtained in the calculations made as a result of the comparisons in Table 4 and Table 5 are shown in Table 6. After the preference ranking is made for all the main criteria as well as the sub-criteria, all criteria are optimized. Optimized weights and consistency values for the main criteria are shown in Table 7.

Table 4: According to Expert-1, the Comparison Matrix of the Most Important Criterion with Other Criteria

Best to Others	**MA**	**ED**	**AS**	**SS**	**PC**
AS	7	8	1	6	5

Table 5: According to Expert-1, the Comparison Matrix of Other Criteria with the Least Important Criterion

Others to the Worst	**MA**	**ED**	**AS**	**SS**	**PC**
MA	1	3	5	6	5

Table 6: Criterion Weights according to Expert-1

Main Criteria	**Weights**
MA	0,061943477
ED	0,098722416
AS	0,549748355
SS	0,131629888
PC	0,157955865

Table 7: Group Decision Weights for Main Criteria

Main Criteria	**Weights**
MA	0,087867989
ED	0,215072987
AS	0,413883638
SS	0,144068397
PC	0,13910699

In Table 8, weights and global weights of all criteria are given. It has been calculated that the most important main criterion is academic staff and consultancy, while the least important main criterion is management and administrative staff. The most important sub-criteria are calculated as professional and personal development, understanding of professional ethics, conducting publications and research, compliance and effective use of course hours, performance evaluation, simulation and laboratories, lecturer diversity in courses, in-service lecturers and foreign language development. Technical and administrative staff have been identified as the least important sub-criteria.

Table 8: Group Decision Weights and Ranking of Main and Sub-Criteria

Main Criteria	Sub Criteria	Sub Criteria Weights	Global Weights	Rank
Management and Administrative Staff (MA)	MA1	0,133819151	0,01175842	29
	MA2	0,136231723	0,011970407	27
	MA3	0,193431994	0,01699648	20
	MA4	0,121935504	0,010714227	34
	MA5	0,064090704	0,005631521	38
	MA6	0,101959563	0,008958982	36
	MA7	0,130403468	0,01145829	30
	MA8	0,118127894	0,01037966	35
Services Offered to the Students (SS)	SS1	0,117096683	0,016869931	21
	SS2	0,241176422	0,0347459	9
	SS3	0,1077648	0,015525502	22
	SS4	0,051257877	0,00738464	37
	SS5	0,124557334	0,017944775	19
	SS6	0,132282429	0,019057717	17
	SS7	0,146902836	0,021164056	13
	SS8	0,07896162	0,011375874	31
Education (ED)	ED1	0,144744204	0,031130568	12
	ED2	0,087400033	0,018797386	18
	ED3	0,095636887	0,020568911	14
	ED4	0,18072622	0,038869328	8
	ED5	0,193530732	0,041623233	7
	ED6	0,091288885	0,019633773	15
	ED7	0,14567009	0,031329701	11
	ED8	0,061002949	0,013120086	26
Physical Conditions (PC)	PC1	0,138146172	0,0192171	16
	PC2	0,101263608	0,01408648	25
	PC3	0,08597946	0,01196034	28
	PC4	0,101410439	0,0141069	24
	PC5	0,081721668	0,01136806	32
	PC6	0,308546056	0,04292091	6
	PC7	0,103317576	0,0143722	23
	PC8	0,079615021	0,01107501	33
Academic Staff and Consultancy (AS)	AS1	0,080321856	0,033243902	10
	AS2	0,138533829	0,057336885	4
	AS3	0,248681812	0,102925333	1
	AS4	0,157864613	0,06533758	3
	AS5	0,133807391	0,05538069	5
	AS6	0,240790498	0,099659247	2

5. DISCUSSION

The study shows that the most important criteria for quality in maritime education are academic staff and consultancy services. The continuous development of the maritime industry and the intensive practices of training in the field bring the main criteria of academic staff and consultancy with its six sub-criteria to the forefront. Professional and personal development (AS3) ranks first among all sub-criteria. In addition to having professional skills, academics should take responsibility and develop themselves professionally and personally to move the sector forward (Yoo et al. 2019). Zilahy and Huisingh (2009) have pointed out that academics should play an active role in formulating strategies and implementing changes that lead to sustainability. It was also determined in the study that academicians with professional ethics (AS6) understanding were the second most influential factor in increasing the quality of education. Professional ethics has been defined as a set of moral codes and rules of professional practice. It is expected that faculty members have moral virtue and ethical principles and convey this because they directly affect their social environment and students. Similarly, Pring (2001) has stated that the issue of ethics in education and training should be taken into account.

Academic staff's scientific work and research (AS4) was calculated as the third sub-criterion affecting the quality. It is thought that academic staff will increase both their own quality and the quality of the educational institution by benefiting from science. It has been observed that the rate of scientific publications has increased within the hierarchy of academic positions. While professors are the most productive staff, people in lower academic positions have fewer publications per year (Abramo et al. 2011). Compliance with lesson hours and effective use (AS2) has been identified as the fourth sub-criterion in maritime education. The courses introduce students to current and relevant topics and give them the chance to benefit from the experiences and knowledge of not only instructors but also their peers. According to Cavanaugh (2002), quality; is a whole that shows how qualitative components such as teaching methods, learning events, materials, learning process, activities, content and options offered to students can be applied effectively and efficiently. The essence of the effective use of the educational process is to plan instructional activities (curriculum, weekly contents, strategies, etc.) to enable students to gain the intended competencies. Faculty members should assign students in-team assignments using a project-based training approach that focuses on practical work. Encouraging students to participate actively in problem-

solving enables them to develop communication skills as well as teamwork skills (Thomas et al. 2013). In this context, the institution should support the understanding of education with curriculum programs that will contribute to the students and aim to bring the institution's quality to the forefront by targeting the students to be qualified individuals by making a qualified assessment.

According to study findings (AS5), evaluation of performance is essential for quality in maritime education. The evaluation will provide academic staff with an overview of all their work, and the outcomes of the evaluation process will help academics see their positive and negative characteristics and improve themselves. Krolak-Schwerdt et al. (2014), the evaluation of educators will be able to measure expected results such as increasing knowledge, understanding, intention, practice and motivation.

Education emphasizes investigation, critical thinking, developing flexible and adaptable applications, and conducting practical experiments (Wiek et al. 2011). Similarly, the study shows the importance of applied training units such as simulation, laboratories (PC6) and related equipment and materials to increase the quality of maritime education.

While providing theoretical and practical training in maritime education, sharing experiences ensures that the training is carried out in a field-oriented structure. In-service (seafarer) academics, who hold senior positions in the maritime sector, such as Captain and Chief Engineers, can bring significant practical and technical expertise and experience to classes (Manuel et al. 2013). At the same time, it is thought that the presence of a large number of seafarer trainers will increase the quality of education and, consequently, the transfer of experience gained in different types of ships to the students. Circulars shared by P&I's and companies in shipping are also the same theme. For example, it is aimed to prevent similar accidents by sharing details about an accident of a seafarer or ship. Increasing the number of seafaring academics globally will provide significant momentum in maritime education.

Another important criterion of the study is the students' foreign language development (SS2). Seafarers may lose job opportunities in the global maritime market due to their poor English language skills. Many countries such as Turkey, Ukraine, the Philippines, India, and Lithuania make the English language exam mandatory for deck and engine officers' competence. Graduates in the maritime field will need fluent English skills to succeed in the workplace (Charlesworth, 2006). The educational institution's contribution to the development of foreign languages will be

an indicator of the quality of education and prove that its students and graduates will have a place in the sector. The quality of consultancy services in maritime education is a useful tool and method for creating career opportunities for students. Students work with the problem, make a systematic inquiry and are guided by the teacher. A unique feature of the added value of good communication and networking can be strong links between programs within the industry and global practitioners; here, the interaction between teachers and students can lead to employment b and promotion opportunities (Shah et al. 2007).

In the study, it was determined that the services and physical conditions offered to the students would help the students to receive a quality education. Higher education institutions provide students and academicians with the necessary terms for research, foundation and equipment (Brunner, 2013). Mahmood et al. (2014) have stated that there is a positive relationship between students' satisfaction with service quality and their motivation to learn. In this respect, motivating the students is crucial in order to ensure that educational processes are successful (Gruber et al. 2010). This is a cyclical process because higher education institutions' quality services motivate students to participate fully in educational processes, which improves the quality of educational outcomes (Subrahmanyam, 2017).

Managing a maritime education institution requires technical knowledge, experience, professional knowledge and leadership. Management should ensure that the quality policy is understood, followed and maintained at all levels of the organization with the help of operational techniques and activities. The systematic rules and timelines for an overview of the various activities should set the teaching objectives with the curriculum, operational plans and examination rules. Responsibilities, authority and the working environment should be determined and documented for all personnel who manage, execute and verify the work affecting the institution's quality. The institution should be based on continuous improvement and commit to this in every activity.

There are financial, quota and preference issues that affect the quality of maritime education. Economic boundaries determine the activities of these institutions. The resource requirement for activities that exceed these limitations is the management's responsibility (Sletner, 2000). Ali et al. (2016) have stated that the increase in student number poses a significant threat to quality. As another danger, Baylon and Santos (2015) state that in order to have a career in the maritime industry,

one must devote himself to the sea, which prevents many young people from considering maritime as a profession.

6. CONCLUSION

Maritime education institutions give their students the right to enter the qualification/license exams during or at the end of the education process. Therefore, it is necessary for them to put quality management into practice in order to meet and maintain the international standards required by the STCW Code. This study aims to provide guidance for the quality criteria in maritime education, for determining what the priorities for increasing the quality are, and in this context, the needs of students, academics and investment procedures. At the same time, this study has enabled institutions to see their strengths and their weaknesses for quality education. The 38 sub-criteria in the study were evaluated using the BWM in line with the opinions of the expert group and classified according to their weights. The current study has also determined that the most important factor in the quality of maritime education is academic staff and consultancy services. In this context, it is extremely important for the academic staff to be willing to perform their professions and focus on their personal development. Moreover, the administrative bodies should provide the academic staff with such opportunities for this matter. Besides, academic staff who have an ethical understanding, make academic contributions by making publications and doing research, and use their course hours efficiently and effectively will increase performance and direct education quality. Apart from the limited study on maritime education institutions in literature, it has been observed that there is not enough research on the quality of maritime education. Especially, Basak (2017) examined 66 studies on maritime education and training. As a result of the study, it was determined that more research and experience is needed to understand the factors of maritime education and training better and to discover infrastructure needs. Although this situation constitutes a limitation for the discussion part of the study, it can be considered an opportunity for future research. Future studies can be detailed by obtaining the necessary permissions and using the results of the inspections carried out by the European Maritime Safety Agency (EMSA) and other administrations in maritime education institutions.

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