

Article

# The educational framework of maritime education and training specialization

Anna Tenieshvili

Independent Researcher, Batumi 6010, Georgia; [anna\\_tenieshvili@yahoo.com](mailto:anna_tenieshvili@yahoo.com)

## CITATION

Tenieshvili A. The educational framework of maritime education and training specialization. *Forum for Education Studies*. 2025; 3(3): 2178. <https://doi.org/10.59400/fes2178>

## ARTICLE INFO

Received: 2 December 2024

Accepted: 18 April 2025

Available online: 24 September 2025

## COPYRIGHT



Copyright © 2025 by author(s).  
*Forum for Education Studies* is published by Academic Publishing Pte. Ltd. This work is licensed under the Creative Commons Attribution (CC BY) license.  
<https://creativecommons.org/licenses/by/4.0/>

**Abstract:** The article “The educational framework of maritime education and training” represents a review of the MET system aimed at preparing specialists for the field of maritime education. It comprises the review of main subjects of MET and some pieces of opinions on these subjects. The main aim of the article is to show the main components of maritime education and the most significant questions that could be raised within the framework of MET.

**Keywords:** maritime education and training; curriculum; specialty subjects; strategic management and leadership, maritime labour

## 1. Introduction

The present article is dedicated to maritime education and training, the specialty aimed at preparing qualified specialists for the field of maritime education. As it is stated in the curriculum of MET specialization: “Maritime education and training is a multi-dimensional, systematic and long-term practice attempting to meet the needs and facilitate the sustainable development of the maritime industry through the cultivation of talents who demonstrate attitude, knowledge, skill and behavior patterns deemed adequately qualified for shipboard tasks and meanwhile, are mentally, morally and aesthetically developed to assimilate changes to the shipping industry brought about by social, economic and technological development in the future”. Consequently, the main aim of the present article is to show the main components of maritime education and the main questions that could be raised within the framework of MET, to give a general overview of MET specialization and to offer some new ideas regarding the principal subjects that represent the main constituent parts of MET.

## 2. Literature review

The present opinion article represents a review of maritime education, considering the cornerstone issues and less significant issues “under one umbrella”. The author of the article holds an MSc degree in Maritime Affairs majoring in “maritime education and training” (MET) from World Maritime University (WMU) and also a PhD in English Philology from Tbilisi Ivane Javakhishvili State University. The ideas and points of view offered in this work are based on the combination of the above-mentioned education of the author and the following sources including internet sources: Mukherjee and Brownrigg [1] “Farthing on international shipping”; [2] Flin et al. “Crew resource management: Improving teamwork in high-reliability industries. Team performance management”; [3] Sampson and Zhao “Multilingual crews: communication and the operation of ships. World Englishes”; [4] Knudsen and Froholdt “The consequences of “Culture’s

consequences”: A critical approach to culture as collective programming applied to cross-cultural crews”; [5] Edward S. et al. “The Educator’s field guide: from organization to assessment; [6] Print “Curriculum development and design”; [7] Sandy T. Soto “An analysis of curriculum development”. Theory and practice in language studies”; [8] Fisher and Muirhead “Practical teaching skills for maritime instructors”; [9] [https://en.wikipedia.org/wiki/Formative\\_assessment](https://en.wikipedia.org/wiki/Formative_assessment); [10] [https://en.wikipedia.org/wiki/Summative\\_assessment](https://en.wikipedia.org/wiki/Summative_assessment); [11] Emad and Roth “Contradictions in the practices of training for and assessment of competency”: A case study from the maritime domain. *Education + Training*”; [12] IMO ISWG, STW 26/inf. Sub-committee STWC; [13] Carson-Jackson “A simulation instructor’s handbook”; [14] “International convention on standards of training, certification and watchkeeping for seafarers” 1978, as amended in 2010 (STCW Convention); and “Seafarers’ training, certification and watchkeeping code (STCW Code)”; [15] Davenport and Prusak “Working knowledge, how organizations manage what they know”; [16] Dalkir “Knowledge management in theory and practice”; [17] Belias and Koustelios “The Impact of leadership and change management strategy on organizational culture”; [18] Katz and Miller “Leaders getting different”, [19] Beer et al. “Why change programs don’t produce change”; [20] Dacanay and Walter “Protecting precarious workers in the global maritime industry: a case of regulatory failure?”; [21] Popma Jan R. Does worker participation improve health and safety? Findings from the Netherlands, policy and practice in health and safety; [22] Bhattacharya “The effectiveness of the ISM code: A qualitative enquiry”.

### **3. Methodology used**

The present opinion paper represents an attempt by the author to consider the main subjects of MET specialization, to offer and discuss the newly offered ideas and to bring in the existing opinions of the famous scholars of the field. It contains reviews of the relevant opinions of different scholars of the field in order to confirm some ideas and illustrate the essence of the main ideas offered by the author in the present work. The present article represents an overview of MET systems and the list of questions this educational branch covers and also the most important questions that could be raised with the framework of MET including possible answers to these questions that represent the novelty of the article.

### **4. Main body of the article**

#### **4.1. The international legal and administrative framework of maritime education and training**

One of the main subjects to be covered within the framework of MET is “The international legal and administrative framework of maritime education and training”. As per the syllabus of MET specialization, the main objectives of this subject are: “to provide a broad appreciation of the role of government in policy formulation and the administration of maritime affairs; to define and examine “maritime administration” conceptually and in terms of governance and organizational structure, using modern management methodologies and techniques; to consider the evolution of international

law in maritime education in particular within the ambit of the International Maritime Organization, and the human element issues that underpin educating for maritime operations”.

Before speaking about Maritime Administration (MA), it would be expedient to define the essence of work of MA: Policy—the aims and objectives; management function; control function; self-evaluation arrangements; the independent evaluation. Cooperation between maritime organizations with MA is very important as it is the superior maritime organization of the country dealing with government, international organizations, parties to the conventions, and coordinating and supervising work of Maritime Educational Institutions (MEIs) of the country through its educational subdivision. The scope of this coordination covers control over adherence of work to STCW standards, via instructions, conducting inspection and audit. The quality of training of cadets and integration of optimum systems for the purpose of improving the process is the priority task of both MA and MEIs as cadet is a main product of MEI and for MA cadet is a potential future seafarer who will have trainings at Maritime Training Centre (MTC) and receive certificate of competency (CoC) and certificate of proficiency (CoP). MA being the governmental body in maritime field is accountable to Ministry of Economy specifically to its Transport Department. MA should consist of three subdivisions: administrative, technical and educational. The corresponding departments of administrative subdivision should be occupied with such issues as relations with government, legal issues, ship registry, flag registry and communications. Technical subdivision and its departments should deal with all technical issues including those related to training, as for educational subdivision through its departments it should be occupied with seafarers’ preparation, training and certification, coordination and supervision of work of MEIs and MTCs. Different models of MA organizational structures can be followed to organize departments and implement all these functions. MEIs are accountable to Ministry of Economy, Ministry of Education and are generally guided by Law about Higher Education. Their structure should comprise the subdivisions responsible for the following fields: 1) studies process including the assessment 2) material and technical basis 3) administration and Quality Management System (QMS).

It is very important for the country party of STCW Convention that its MET system complies with STCW convention. STCW Convention through its resolution and regulations directs and instructs work of all maritime organizations of the country. This can be implemented by appropriate maritime policy, correct organizing, structuring, planning, incorporating and adhering to the right quality standards, taking all measures to reach the main aim of Maritime Education and Training Certification System (METC)—producing highly-qualified and properly trained seafarers.

METC system is a foundation plate of maritime field of any country that needs to develop this field due to its geographical position or strategic role the country has to play on the international arena. METC system comprises work of many institutions related to maritime field starting from MA as government representing body and also comprising all MEIs both of higher education and vocational schools the country already has or is going to establish. In this view it is very important to follow the official document of IMO—the STCW Convention with amendments of 2010 being the updated version of the document. The STCW Convention, its Resolution 1

including Chapters I-VIII represents the standard to be followed during establishment and implementation of METC system of the country. So, the main institutions to implement STCW Convention are MA and MEIs: maritime academies, colleges, vocational schools, maritime training centers (MTC). All these organizations shall be guided by policy that should be worked out and based on the principle mentioned by Mukherjee in his work “Farthing on International Shipping”: “In the development of maritime policy, the object is not only the promotion and protection of national interests but also their international implications” [1].

Coordination and improvement of work of maritime education and training institutions (MEIs) by MA should be given priority in implementation of robust METC system as these institutions are responsible for teaching and training of future seafarers and according to Mukherjee “Proficiency and Competence can only be achieved through proper MET” [1].

Each MEI should work out strategic plan of development for next 5 years which should be followed by any Management that will become head of MEI. The plan should be updated every 5 years or more often upon necessity rising due to changes in national legislation or major amendments to maritime conventions. This should be fulfilled in close cooperation with MA. It would be good if qualified instructors are sent to IMO meetings and even take part in development of IMO model courses. The curricula for different specializations should be drawn on basis of experience of STCW Parties with highly-developed MET. If it is necessary transition to new curricula should be implemented gradually, preserving the existing old curricula features and introducing new with simultaneous check-up of the results of such introduction. The curricula of MEIs are subject to accreditation by accreditation bodies or departments of Ministry of Education, therefore the curricula and syllabi should be drawn according to existing laws, norms and standards stated by accreditation bodies/departments.

Only highly-qualified maritime professionals who are capable to offer the students appropriate training as per Reg. I/6 of STCW should be invited to MEIs and MTCs. To ensure high qualification and proper training of the instructors and assessors some of the invited maritime professionals should be sent to other STCW Parties with more experience in the corresponding field to receive proper instruction for their further work as per Reg. I/6(2) of STCW. They will be able to share knowledge and experience gained there with their colleagues in MEI and MTC in the future. Due to specificity of the field of studies Simulator Training should be incorporated in the curricula from I year of studies to let the students of MEIs familiarize themselves with their future profession on different levels of knowledge of maritime affairs as it is the case at most advanced MEIs of the world as part of STCW convention implementation. Certain parts of STCW Convention and Code should be taught to maritime students both in native language and later in adapted form or in original in English with emphasis of the future specialization of the student, e.g. Chapter II—Master and Deck Department should be explained in details to Navigation students, Chapter II—Engine Department to Marine Engineering and Electrical Engineering students. STCW Convention through its resolution and regulations directs and instructs work of all maritime organizations of the country. This can be implemented by appropriate maritime policy, correct organizing, structuring, planning,

incorporating and adherence to the right Quality Standards, taking all measures to reach the main aim of METC—producing highly-qualified and properly trained seafarers.

#### **4.2. Educational psychology and sociology**

“Educational Psychology and Sociology” is the subject of importance as for the whole system of MET education itself, its curriculums and syllabi, as well for preparation of future seafarers to facilitate their work on modern ships in the future. As per syllabus of MET specialization the main objectives of this subject are: “to discuss the fundamental principles of education including theories of learning, cognition and motivation that can be used both in traditional MET institutions and for life-long learning; to examine learner diversity and culture in learning and operational environments and social dynamics in onboard training; to discuss effective communication and related issues of concern to the maritime industry including linguistics”.

One of the most important issues of educational sociology in MET is sociology in maritime context. Learning methods used are case study method, problem-based learning, group learning. The following are the most important questions of sociology in maritime context: human element, culture, cultural awareness, communication, social dynamics. Such issue as social dynamics is very important in any context of human activity including maritime context as interaction and communication of seafarer’s form part of human element (HE), on which the efficiency of the maritime fields is largely dependent. Social dynamics in maritime context includes such categories as interrelationships, communication and interaction between seafarers taking into consideration social, cultural, linguistic, age-related barriers and in addition the specific type of interaction between crew members on board conditioned by ship’s hierarchal system. Social relations are dependent on similarities and differences of social individuals that form part of a given society. If we view maritime field from sociological point of view, we may see that crews represent social groups in maritime context. In contemporary world, we generally confront with multinational and multilingual crews that form about 60% of today’s maritime world. Impact of cultural differences on communication, overcoming cultural barriers, role of Maritime English and Standard Marine Communication phrases (SMCP), importance of team work, and consequently crew resource management, bridge team management—all these are crucial issues that determine and control social dynamics in maritime context. Each component of social dynamics in maritime context is important but to different extent in relation to different countries. If I take my country as an example, students of maritime educational institutions would especially benefit from cultural element incorporated in the process of studies as it would develop certain cultural awareness in them resulting in knowledge about other cultures and their appreciation, that would decrease their ethnocentrism and would help them to adapt themselves to the multicultural environment on board vessels with multinational crews.

Effective team work and proper social interaction between members of the crew are as important and contribute as much to the efficient shipping and avoidance of accidents as the level of professional preparation of seafarers. In his work “Crew

resource management: Improving team work in high reliability industries. Team Performance Management” Flin states that “core skill modules in CRM course typically include: team work, leadership, situational awareness, decision making, communication and personal limitations” [2]. In other words, the issues of importance on board from the viewpoint of social dynamics include: interrelationships between members of the crew, social interaction, social facts, social types that can be confronted in maritime field and should be studied to avoid and solve conflicts on board. As it was already mentioned, social dynamics, models of social facts are dependent on such criteria as: culture, age, gender and position in the ship’s hierarchy. All these criteria represent barriers that should be overcome for the purpose of successful communication between members of ship’s crew on board a ship.

One of the most important components of social dynamics on board a ship is interrelationships between members of the crew within ship’s hierarchy. Multinational crews, to a certain extent have become a solution to the problems that may arise within ship’s hierarchy and prevent misusing of the power by the officers towards ratings and inferior members of the crew. Obedience and fairness are clues to successful interrelation between the ratings and the officers provided that roles are distributed fairly and evenly and each party knows its rights, obligations and responsibilities. The other important factor is avoidance and/or elimination of misuse of power - very important factor to avoid conflicts due to vertical organization of ship’s hierarchy. But it was not always this way, especially in homogeneous crews, or crews consisting only of two or three nationalities, frequently forming the contradicting groups on ships. Therefore, a lot of seafarers worldwide prefer working in multinational crews explaining this preference by better treatment and better working environment. In their work “Multilingual crews: communication and the operation of ships. World Englishes” Sampson and Zhao state “This reminded me of a colleague’s comments about the courtesy of seafarers and it’s certainly true that they are very polite although there is evidence on this ship that some of them are less courteous with their “countrymen” than with other nationalities” [3]. The issue of nationality is very acute in the modern maritime world of multinational crews; therefore, it often becomes a subject of research and discussion by different scholars and researchers who investigate the issue from different perspectives. As cited by Knudsen and Froholdt in their work “The consequences of “Culture’s consequences”: A critical approach to culture as collective programming applied to cross-cultural crews”: “according to Oestreg, it is precisely because the ships are highly hierarchal work-place, that there is a huge interest in the relationship between nationality and rank; the question being which nationals are best suited to be subordinates or superiors” [4].

One of the barriers to successful communication that should be overcome in the modern world of multinational ships’ crews is linguistic barrier. Mastering of maritime English (ME) and Standard Marine Communication Phrases (SMCP) is step towards it and also represents important means for acquisition of communicational skills, as English is official language of maritime communication. As most of accidents at sea happen due to human factor that in its turn depends on communication, proper knowledge of ME and SMCP is crucial. Therefore, proper usage of SMCP as a mechanism preventing accidents happening due to human errors often caused by communication problems should be made mandatory. Incorporation of requirement

for holding certificate or equivalent document proving the proper knowledge of SMCP according to the field of specialization could be a solution to a problem of miscommunication on board ships due to linguistic misunderstandings. Communication between members of the crew is important as it reduces “dialogue insufficiency” on personal and professional levels. In addition to this phenomenon implies not only communication itself but organization of work process, dependent on organizational awareness of the individuals conditioned by several factors including such extremely different ones as culture of the individual and technologies used. The ways of overcoming barriers between members of the crew, respect to individual social space of seafarers and tactful non-violation of this space by other members of the crew irrespective of their specialty and position on board can be one of the components that would contribute to establishing good relationship, good atmosphere and high work performance guaranteeing safety on board a ship.

To summarize, I can say common issues of social dynamics in a maritime context are decision-making, work performance, interaction, intercultural management, learning, professional development, correspondent trainings as the learning environment contributes to collectivism and improvement of social relations, a sense of teamwork when each individual feels himself as part of the integral “team machine”, being aware of his/her tasks and role in the team, usage of communicational skills the individual has worked out for teamwork, and also a sense of leadership. In spite of different social models and patterns of behavior, any concrete situation requires concrete decision-making based on situational awareness and situational familiarity that are, to a certain extent, dependent on knowledge, individual features and experience.

### **4.3. Curriculum development and design**

Such a subject as “Curriculum Development and Design” is the cornerstone of any educational curriculum including MET. As stated in the syllabus of MET specialization, its main objectives are: “to impart an understanding of the nature of curriculum and its scope in maritime education and training; to discuss macro/micro and internal/external influences on curriculum development and design; to study the processes of curriculum design and development with particular application to maritime education and training; to allow for an appreciation of and ability to develop curriculum documents for different purposes”. Some of the most significant definitions of curriculum are: As per Edward, Ebert, Benteley: “Curriculum refers to the means and materials with which students will interact for the purpose of achieving identified educational outcomes” [5]. Print brings a broader definition of curriculum defining it “as all the planned learning opportunities offered to learners by the educational institution and the experiences learners encounter when the curriculum is implemented. This includes those activities that educators have devised for learners which are invariably represented in the form of a written document and the process whereby teachers make decisions to implement those activities given interaction with context variables such as learners, resources, teachers and the learning environment” [6]. On the basis of this definition, we may see that there are four players in the curriculum development and design process. They are learners’ resources, material

and technical resources, teachers and instructors and the learning environment. The learning environment comprises buildings, facilities, and equipment necessary to conduct the process of studies and also the background knowledge and motivation of the learners. Curriculum is the main foundation on which all processes of studies are based and depend on. Therefore, such an important component of the process of studies should be developed by adequately prepared and experienced specialists who will take into consideration all components that will ensure the effectiveness of the curriculum and will help to receive the right product—highly qualified specialists—seafarers in the case of maritime education and training.

The following are necessary components to be taken into consideration by the designer during the process of curriculum development and design: curriculum contents, curriculum subjects, set objectives, expected learning outcomes, ways of implementation of all set objectives to receive expected learning outcomes, assessment criteria. In order to develop and design curriculum, the designer should define the current state of the curriculum, define the shortages of the existing curriculum, set the objectives for improvement in order to meet the requirements of the industry, define learning outcomes and define the quality of existing resources for the design and implementation of the curriculum. In addition to the above-mentioned main components of curriculum design and development process the following supplementary issues should be taken into account: industry's requirements, requirements of Ministry of Education and Law of Higher Education, requirements of Ministry of Transport, stakeholders' requirements, government requirements (policy) included in hidden curriculum, existing curriculum, present experience, experience from the countries with developed MET systems, existing resources: faculty, learners' resources, development of material and technical basis, purchase of necessary equipment and facilities, inviting specialists of certain specialization and also curriculum development specialists.

Curriculum is one of the main components, the foundation of the educational process of any educational institution. Therefore, the process of its development and design should not be spontaneous but well prepared and thoroughly developed. The main intention of curriculum design is systematization of the process of studies according to the needs of specialization, meeting the requirements of the corresponding field with the purpose of producing highly qualified specialists. Curriculum should be relevant to the learners' needs and background knowledge. Thus, learning objectives and learning outcomes should be based on the specific character of the maritime field, taking into consideration the national school curriculum that defines the academic level of students entering higher educational institutions. The lists of topics constituting separate subjects that should be included in the curriculum of MEIs are given in International Maritime Organization (IMO) model courses. Being the official documents issued by IMO as reference and guidance for MET institutions all over the world, model courses require interpretation and adaptation when incorporated into the contents of the curriculum. The reason for that is the specific character of systems of national education in different countries and the necessity to adapt model courses to these systems in order to make them practically applicable. This is the main reason why unified curricula for MET institutes have not been developed so far and IMO Model courses are offered only as guidance.

Due to the specificity of the MET curriculum, it should comprise not only traditional ways and methods of teaching but also other learning activities such as case studies, simulator training that, to a certain degree, substitutes seagoing practice, etc. Content selection in such a well-developed sphere as MET when there are a lot of progressive MET institutions all over the world should be analytical rather than intuitive. The experience that certain MET institutions have gained over the years, combined with the experience of the world's leading MET institutions considering technical progress and innovations in the field, may serve as a model for guidance. Once every 4–5 years, a curriculum design specialist should be invited to the MET institution and in cooperation with the local faculty, an adequate curriculum should be designed or changes and updates to the existing one should be made. During the process of curriculum design, the designers should give priority to subjects most important to the maritime field on the current stage that are not easily acquired by the students in the particular country. Curriculum should include maritime and technical subjects, humanities, subjects that consider linguistic, cultural and sociological aspects of communication on board a ship, including even elements of history, religion. During the process of curriculum design the evaluation and assessment stages are necessary components for confirmation of the curriculum. The professionals and auditing organizations can evaluate the curriculum comparing it to the curricula of other MET institutions and also check ways of its implementation. For this purpose, evaluation of the studies process, purchase of training equipment, simulators, invitation of maritime specialists and their proper training are necessary. The faculty and instructors implement the curriculum, therefore their education, work experience and level of preparation for certain courses should be adequate and they should be evaluated on the degree of conformity of these issues to MET requirements. The efficiency of the curriculum can be really evaluated only in the course of time, when its first products enter the labor market. Thus, Tyler as cited by Sandy suggested that “evaluation should be conducted at the beginning and at the end of the instruction process in order to measure the changes developed in the studies” [7]. Besides, students should acquire practical skills for implementation of acquired knowledge in practice. The inseparable and very important part of the curriculum of the MET institution is the moral upbringing of students aiming at developing a sense of discipline in future seafarers—the necessary component of maritime education that ensures their successful work on board. The efficiency of the curriculum in MET institutions can be measured by the quality of its product—seafarers. Unlike graduates of other higher educational institutions MET institutes' graduates can answer the question “What can I do now that I have obtained my degree?” quite easily, as the maritime field offers them quite stable preplanned opportunities with possibilities of career growth.

Due to the specific nature of MET institutions, special attention should be paid to simulation as it provides the students with a unique chance to get experience in a learning environment. Therefore, nowadays MET institutions spend a lot of funds on the purchase of simulators and equipping laboratories with modern facilities. As Fisher and Muirhead stated in their work “Practical teaching skills for maritime instructors”: “the simulator if used effectively, provides an alternative medium in which to acquire operational skills in a risk-free environment” [8]. Proper and fair assessment of the

students in a wide scope of learning activities including simulator training is also an issue of importance in the maritime field. For this purpose, the adequate assessment system should be worked out based on the specific character of training. The effective components of assessment system can be borrowed and applied from the leading MET institutions on the basis of cooperation. As MET requires criterion-based assessment, the knowledge and proficiency of students and trainees should conform to certain criteria. In this respect diagnostic, formative and summative assessments can be used to assess the student's knowledge before starting the course, during the course and after completion of the course. The last two should be paid particular attention when speaking about the MET system. Thus, as mentioned in wikipedia: "formative assessment, formative evaluation, formative feedback, or assessment for learning, including *diagnostic testing*, is a range of formal and informal assessment procedures conducted by teachers during the learning process in order to modify teaching and learning activities to improve student attainment [9]. Summative assessments are designed both to assess the effectiveness of the program and the learning of the participants. This contrasts with formative assessment which summarizes the participants' development at a particular time to inform instructors of student learning progress [10]. In MET due to the specific character of the field and its practical importance the formative assessment of knowledge gained during the course in the form of "course assessment" may be considered as vital, whereas summative assessment in the form of final grades will help students to sum up their knowledge in this way transferring it to long-term memory. In order to ensure fairness of assessment, certain marker descriptors should be worked out in order to make the distribution of marks and grades clear for students. Since the maritime field bears a practical character for the purpose of assessment it is relevant to design and apply exercises imitating the working environment being guided by criterion-based assessment.

Thus, curriculum is one of the most important components of any field of education including MET. Therefore, proper development and design of the curricula are very important. They should meet the demands of specializations, the maritime industry, the Ministry of Education, and governmental policy. Proper development and optimal implementation of curricula are a guarantee of the improvement of the MET system and, consequently, the level of students graduating from MET institutes.

#### **4.4. Curriculum delivery and assessment**

"Curriculum Delivery and Assessment" is another cornerstone of MET. As it is stated in the syllabus of MET specialization, its main objectives are: "to examine principles and practices of effecting delivery relevant to the MET context; to give an in-depth appreciation of how curriculum delivery can be optimized using contemporary tools including simulators, information and communication systems, learning management systems and e-learning; to discuss student assessment and curriculum evaluation methods including the use of advanced statistical analysis". As maritime education and training require a competence-based approach and assessment, simulator training is one of the best means for the implementation of competence-based training. As mentioned by Fletcher cited by Emad in his work "Contradictions in the Practices of Training for and Assessment of Competency": A

Case study from the maritime domain. Education + Training”: “There are mainly two concepts of CBT presently in practice, the US and UK models. The UK standards or competencies are considered as units of assessment of workplace activity, whereas in the US model it is the use of competencies within the learning process that takes priority. The US model is related to a training program, whereas in the UK it refers to training and assessment in the workplace or in a job-like environment—although the focus in the USA has also now shifted to on-the-job training” [7]. The maritime industry adopted UK model of CBT. Simulator is a perfect solution to one of the prominent STCW issues—transformation of knowledge into competence. As with other types of education, simulator education has also adopted the following types of assessments: summative assessment; diagnostic assessment, formative assessment.

“Simulation is a realistic imitation in real time, of any ship handling, radar and navigation, propulsion, cargo, ballast or other ship system incorporating an interface suitable for interactive use by the trainee or candidate either within or outside of the operating environment, and complying with the performance standards prescribed in the relevant parts of the STCW code” [12]. It is expedient to bring the definition of simulator mentioned by Carson-Jackson in his work “A Simulation Instructor’s Handbook”: “A simulator is primarily a kinesthetic training aid that allows for manipulation in a realistic environment—a working representation of reality. However, one of the main strengths of simulation is that it combines all three categories of training—visual, aural, and kinesthetic, which makes it a very strong and powerful training tool” [13]. The kinesthetic approach is clearly defined by Knowles as cited by Carson-Jackson: “Given the choice between two techniques, choose the one, involving the learners in the most active participation” [8]. According to STCW 95 section A-I.12 “the simulator shall be capable of simulating the operating capabilities of shipboard equipment concerned to a level of physical realism appropriate to the training and assessment objectives” [13]. As mentioned by Hardin cited by Emad in his work “Contradictions in the Practices of Training for and Assessment of Competency”: A Case Study from the maritime domain. Education + Training”: “The new amended STCW 95 laid out greatly improved seafaring standards through competency-based training (CBT). The training mandate of STCW 95 is outcome-based; it requires that candidates for licenses demonstrate their ability to perform the task for which they are going to be certified. It means applicants for competency certificates are expected to show that they are able to “do” what they are trained to do” [11]. Simulator is a perfect solution to one of the prominent STCW issues—transformation of knowledge into competence. The instructor plays an important role in simulator training and it is a well-known fact that the interactive elements in simulator training are the instructor, the simulator, the student, and the training program.

There are the following types of simulators: navigation equipment, GMDSS, radar, radar and navigation, ship handling, fisheries, inland waterway, dynamic positioning, crane handling, vessel traffic management, search and rescue, oil spill management, propulsion plant, steam generating plant, electrical power plant, refrigeration plant, cargo handling, ballast control, dredging ship, offshore processes, drilling technologies. The simulation exercise involves the staff and operations to be performed. It is aimed at training individuals, resulting in the improvement of overall

team performance. The designer of such simulation exercises should also take into consideration the fact that heavy-lift operation is teamwork and design several workstations with adequate distribution of tasks.

#### **4.5. Knowledge management**

“Knowledge management” is another important component of any education program including MET. As it is stated in the syllabus of MET specialization the main objectives of next component of MET “Knowledge management” are: “to consider knowledge management and its importance to modern organizations and maritime clusters in improving operational efficiency; to understand the use of socio-technical skills and modern technology in creating, acquiring and transferring knowledge; to examine knowledge and knowledge repositories and their support, maintenance, development and use for organizational and industry growth; to examine how organizations, learn and how this impacts growth, sustainability, relevance and profitability”.

Modern technologies and the incorporation of the World Wide Web into all spheres of human activities serve as facilitators in reaching these goals; new forms of knowledge management and organizational learning such as e-learning online platforms are added to the already existing forms of knowledge management, such as data, books, periodicals, etc. Modern online platforms, such as the Moodle platform ([www.moodle.org](http://www.moodle.org), [www.moodle.com](http://www.moodle.com), Moodle Cloud, Camtasia) and other systems make it possible to offer the learners a lot of knowledge without time and space limitations and ensure a new modern type of organizational learning. The e-learning platform offers different activities that can be added to the training, such as: assignment, video training via e-classroom using, zoom, BigBlueButton, external tools to add video from other internet sites. The materials can be transformed into Book format thus making them more interesting and understandable for the trainees. Any file can be added through the “File” function. Any link can be added through the URL function offered by the e-learning platform. All these features make e-learning applications indispensable tools in the accumulation and dissemination of knowledge to any interested trainees all over the world without space and time limitations as it was shown in the examples of training, mentorships and assessment developed by us through the e-learning application “Moodle Cloud.”

All organizations should work on the development of their structures and modes of functioning to make the work of the organization as efficient as possible. The phenomenon of knowledge management that has been widely used during the last decades implies organization of knowledge and organizational learning in the company to ensure these goals. Modern technologies and the incorporation of the World Wide Web into all spheres of human activity serve as facilitators in reaching these goals; new forms of knowledge management and organizational learning such as e-learning online platforms are added to the already existing forms of knowledge management such as data, books, periodicals, etc. Speaking about such subjects as knowledge management it would be relevant to differentiate between data, knowledge and information as mentioned by Davenport in “Working Knowledge, How Organizations Manage What They Know”: “Data, information and knowledge are not

interchangeable concepts. Data is a set of discrete, objective facts about events. Information is “data endowed with relevance and purpose. Data becomes information when its creator adds meaning. Knowledge is a fluid mix of framed experience, values, contextual information, and expert insight that provides a framework for evaluating and incorporating new experiences and information” [15]. As per Dalkir K: “Knowledge management can be considered as a continuous cycle of three processes: 1) Knowledge creation and capture; 2) knowledge sharing and dissemination; 3) knowledge acquisition and application” [16]. From this point of view, e-learning platforms are facilities for the accumulation, sharing and dissemination of knowledge that will ensure its acquisition and application in the future by the learners.

Assessors examine the theoretical knowledge of the trainees in an official way by preparing tests or questions for examinations thus combining assessment of theoretical knowledge with practical skills oriented toward developing the trainees’ competency. The World Wide Web and new technologies offer absolutely new opportunities to companies to facilitate knowledge management and contribute to organizational learning. The e-learning online platform offering training, mentorship, and assessment of seafarers represents a practical example of a new, expanded style of learning accessible to any trainee in the world via opportunities given by the World Wide Web.

#### **4.6. Strategic management and leadership**

Strategic Management and Leadership is another significant subject to be studied within the framework of MET. As mentioned in the syllabus of MET specialization its general objectives are: “to provide in-depth understanding of the role and significance of strategic management and discuss tools for optimum strategic planning; to explore human resource management theories and practices and their applications to the maritime industry; to examine concepts of and approaches to leadership and the exercise of power and influence; to understand the basic principles of managerial accounting and discuss the funding of maritime education; to discuss the meaning and relevance of corporate social responsibility for sustainable and value-centered maritime operations”.

The work of the MET system is influenced by a lot of external and internal factors, such as global trade flows, the world maritime labor market, the political and economic state of the country, global technological progress, and the country’s educational system. Thus, world trade and a country’s economic situation can condition the increase and decrease of the intake of students to MET institutions. MET institutions of the country can distinguish their roles, one producing officers, and the other ratings, when some MET institutions can produce both. The maritime education and training system of the country (which includes MEIs, MTC and the maritime administration’s certification department) attempts to supply the maritime field with professionals educated in accordance with the requirements of the field, also placing emphasis on the specifics of cargo carried on board and types of ships. To perform stakeholder analysis, including customer needs, the analysis of MEI’s status quo—the previous state and mission of MEI—should be checked and compared, information from the shipping industry and crewing agencies should be constantly updated, the

quality of the product of MEI—the quality of education of graduates—should be brought into conformance with the requirements of the maritime field.

SWOT (strengths, weakness, opportunities, threats) and PESTELE (political, economic, socio-cultural, technological, environmental, legal, ethical) analyses of the current situation at MEI would be of great importance for defining the aims and strategic development plan. Any processes in the work of the MEI, MTC or MA certification department are controlled and led by leaders. Therefore, the notion of leadership is very important when speaking about bringing a particular institution into conformity with certain standards or requirements of the field. In order to implement any plan and goals the leader should take appropriate measures and make certain changes. As cited by Dimitros Belias in the article “The impact of leadership and change management strategy on organizational culture”: “Strategic leadership needs to be transformational if it is to serve the organization” [17]. Thus, it means that leaders should make transformations and changes. The question that arises is: “How are leadership and change related to each other?” We tried to give an answer to this question: Leaders are always working not only as managers but also their task is to bring the work of the organization into conformity with the changing requirements of the modern world. Leaders are the very people who implement the changes; therefore, leadership and change are always interconnected.

In order to determine goals and objectives for structural change initiatives it is necessary to see how other more successful MEIs work, study their experience, integrate changes into the structure accordingly. To establish performance criteria, the quality assurance department of MEI should demand a certain percentage of successful students and the graduates who do not conform should be retrained or the monitoring of the quality of the studies process and fairness of assessment should be established. To develop alternative structural process designs, compare, evaluate, it is necessary to integrate gradual changes into the structure of MEI if it becomes necessary.

It is important that the staff of MEIs, MTCs and MA be completed with competent people with qualifications directly related to the field. For this purpose, it would be expedient to invite acting seafarers on a part-time basis. The contract on leading one subject can be concluded with two seafarers who would replace each other during the course. It is also reasonable to invite specialists who have retired from the sea. The MEI should create attractive conditions for seafarers to work in such institutions and become interested in research.

In order to improve the quality of work and contribute to its development it is important to start buying access to relevant maritime literature and MET periodicals. A lot of maritime journals are available online nowadays. The access to these journals can be bought easily. To be aware of the news of maritime field access to the knowledge center of IMO would be an advantage. Another step would be the employment of qualified staff for processing maritime literature and MET periodicals. People related to the maritime field should work on these publications. In the process of working, they will gain experience and will be able to elicit more information from these sources and become good professionals. Such steps as the employment of curriculum specialists for permanent updating of the programs and curricula will ensure the development of curricula in a maximally professional way.

The management should be oriented on the development of the institution in the right direction according to the existing plan. Investors and government should constantly control the work of the management of MEI and MTC as they should not leave the work of MEI completely at the institution's disposal. The work of MEI, MTC should be regularly checked and monitored by the government and stakeholders. Close cooperation with shipping companies, shipbuilding companies, ship equipment manufacturing companies will ensure better awareness of their requirements and will help the MEI to adapt the studies process to these requirements. Another step would be the integration of change management upon necessity. In the modern globalized world, the maritime field is one of the most globalized spheres of human activity. It is very important to integrate changes to MEIs, MTCs and MA to bring them to one common standard. This would facilitate cooperation with maritime institutions of other countries and international bodies like IMO. The institution should conduct a situational analysis of the state of MEI; develop vision, mission and state core values that are basement for both vision and mission. The vision, mission and core values of MEI should be constantly reconsidered with the purpose of updating them in accordance with the requirements of the field. For this purpose, MEI should follow the Plan, Act, Do, Check paradigm and plan their actions, take measures to act—carry out all the plans, do/carry on implementation of plans, check/audit what has been done.

There should be specialists who would be responsible for knowledge of IMO conventions, the Maritime Labour Convention, and documentation at MEI; they should have regular meetings with academic staff of MEI to communicate all the new information to them. In this way the academic staff will be kept up-to-date, and management should find other ways of staff development.

Heads of all departments should cooperate with the HR department, and then they should communicate the results of their communication to the manager/head of MEI. This is quite important as heads of MEIs should have all the information available in order to conduct effective management. As stated by Katz, “As they collaborate toward common good, they establish higher-performing patterns of interacting, enhancing individual, team, and organizational results” [18].

All staff members should fulfill their duties and should be ready to help their colleagues from other departments to ensure that such cooperation helps them in achieving optimal results for the benefit of MEI and make necessary changes.

The human resources department should ensure tolerance towards aged staff members as MEI, MTC often employ aged maritime professionals who have retired from the sea. Their work experience is extremely important as they can make changes to the programs based on their own experience. As stated by Beer: “Since these courses grew directly out of the employees' own experiences, they were far more focused and useful than traditional training programs” [19].

MEI should have a special department that would ensure discipline, completed with former aged officers who would bring up the sense of responsibility, politeness, strictness and other necessary qualities in the future seafarers. Another important issue to be addressed for MEI is buying equipment necessary for conducting studies on the proper level; renovating buildings and facilities and ensuring their adjustment to the equipment; buying training vessels and ensuring practical training of the future seafarers; buying modern simulators for MEI and MTC; and ensuring the updating of

simulator exercises to meet the diversity of the maritime field and train students for work on different types of vessels. All these measures would be of significance in order to develop the country's MET system and bring it into conformity with modern standards.

#### **4.7. Maritime labor and its contemporary issues**

Another important component of MET and the maritime field in general is the subject "maritime labor and its contemporary issues". Representing the main purpose of MET, its main objectives as per the syllabus of MET specialization are: "to examine contemporary issues relating to the supply of and demand for maritime labor, the welfare, rights and fair treatment of seafarers; to discuss in details international maritime labor standards and standards relating to seafarer education and training; to provide an overview of the role of the human element in the enhancement of shipboard safety and operational efficiency". The most important questions of maritime labor are the human error factor, diversities in maritime labor, and seafarers' rights.

The supply of seafarers to the international maritime labor market is dependent on the quality of education received at MEIs in the country. This in its turn depends on the organization of studies processes at MEIs, curricula according to which studies processes are conducted, qualifications of lecturers and equipment of laboratories and MTCs, where the practical part of training is delivered. In order to ensure that MEIs are able to give education to their students to meet the demands of the contemporary maritime labor market, the government should support MEIs financially by inviting specialists of the field to lecture in them, curriculum specialists to update curricula and helping MEIs purchase new necessary equipment and constantly update simulators and simulator exercises to correspond to the latest standards of the maritime field. The regulating bodies should monitor the compliance of MEIs and MTCs of the country with the requirements of the STCW convention and other conventions of the IMO. Educational programs can be redesigned on the basis of programs of MEIs of other countries with successful experience in the MET field. Yet, changes should be made carefully, taking into consideration the national educational system of the country, specifics of the methodology of teaching in the particular country.

Recruitment usually implies employment of experienced seafarers. An inseparable part of this process is ensuring graduate cadets of MEIs have sea-going practice in order to give them a chance to complete their education and become seafarers. A special mechanism should be worked out to monitor whether the principle of fairness is applied when selecting cadets for sea-going practice. The government should also cooperate with governments of other countries to take measures on ensuring sea-going practice for the graduates of the country's MEIs, selecting the candidates on the basis of fairness. The monitoring should be conducted by the government to guarantee that there are no cases of national, racial, religious or gender discrimination in selecting seafarers or MEIs' graduates for supply to sea-going vessels. The other important thing to be avoided during the selection process is nepotism. Diversity of human resources is often a guarantee of good quality of work and consequently this factor should be taken into consideration in such a globalized industry as the maritime field.

The maritime field of the country should be considered an important part of the country's economy. Such an issue as the supply of seafarers to the international labor market is very important for any maritime nation as it shows the quality of work of the country's maritime educational institutions and at the same time, it is a guarantee of seafarers' economic contribution to the economy of the country in the future. Nowadays a lot of countries have a problem with seafarer supply. In most maritime nations the percentage of the MEIs graduates who are given a chance to have sea-going practice and become seafarers is not very high in comparison with the number of MEIs graduates. The problem is caused by the non-willingness of shipowners to ensure sea-going practice for graduates of MEIs as they do not see immediate profit for themselves in it. Some nations, like the Netherlands, solved the issue by offering a reduction of taxes to shipowners, who are now obliged to ensure sea-going training for the graduates of MEIs on their vessels as compensation. As the modern maritime world lacks officers and has an excessive supply of ratings it would be expedient for the country to be oriented on producing officers. If the country has MEIs producing officers they should be developed to ensure education and training of better quality, those producing the ratings should be reformed into higher educational institutions to offer courses not only for the ratings but for the officers too.

The important issue that should be paid attention to is the attraction of women to study at MEIs. Women would be a very important human asset to the maritime industry both from quantitative and qualitative points of view. In many Asian nations, women are very diligent and talented. If they overcome some prejudices caused by traditional upbringing and religious beliefs they could become a valuable source of human resources supply to the maritime field of the country.

Any maritime nation that has maritime higher educational institutions and produces seafarers confronts the problem of recruitment of its seafarers by international shipping companies. Crewing agencies serve as mediators in the process of seafarers' recruitment. As for recruitment of the seafarers the government should promote the opening of international crewing agencies in the country, creating good working conditions for them, favourable tax rates, etc. Crewing agencies are very important mediators between seafarers and shipping companies and any government should take that into consideration. As stated by Dacanay in the article "Protecting precarious workers in the global maritime industry: a case of regulatory failure?": "The private crewing agencies are considered to be integral tools of state control, connecting not only the seafarers to foreign ship operators, but also foreign ship operators to the Philippine state and its judicial system" [20].

The updated news and documents from IMO should be made available to all seafarers especially to those who are to be recruited in the near future. Shipping companies and crewing offices should communicate such information to the seafarers on a regular basis.

As the maritime field is developing very rapidly from a technological point of view, the government should keep MEIs equipment and simulators updated to be able to prepare graduates who would meet the requirements of the modern maritime labor market. It is especially important in view of the upskilling and reskilling of seafarers, which are two of the major issues of the maritime industry.

The modern maritime industry is the most globalized field of human activity. Nationals of different countries are employed by the shipping companies and nowadays ships' crews are generally multinational. Nevertheless, in cases of emergency or some other cases the seafarers' rights can be violated, and their occupational health and safety may not be ensured on the proper level. The government should take measures to protect the rights of seafarers of their country. For this purpose, lawyers specialized in maritime law should be invited to the country to participate in drawing up the contracts, checking and stipulating the conditions, protecting seafarers' rights. Another option is to send lawyers from the country to the international institutes, such as the International Maritime Law Institute in Malta (IMLI) or the specialty of Maritime Law & Policy of the World Maritime University (WMU), Malmo, Sweden. As a result, the country will have specialists of maritime law devoted to their country who would work for the benefit of their compatriot seafarers, defend their interests and prevent violation of their rights.

It would be expedient to pay particular attention to occupational health and safety and organize a special commission on the international level representing the country and protecting seafarers' rights in this aspect. The commission should consist of seafarers and specialists in the maritime field. As stated by Popma in the article "Does worker participation improve health and safety? Findings from the Netherlands": "The added value of worker participation is greatest when workers are actively involved in the assessment of risks on the shop floor and when they can contribute to measures to prevent risks" [21]. Government should control that crewing agencies working in the country send seafarers of the country only to the ships where occupational safety is ensured according to the International Safety Management Code (ISM). As Roberts says, cited by Bhattacharya in the article "The effectiveness of the ISM Code: A qualitative enquiry": "The ISM Code is the main instrument on safety management in the maritime industry, which, as the research shows is the most hazardous judging by its occupational mortality" [22]. The additional concern of the government should be such issues as cooperation with crewing agencies that represent shipping companies with good reputations that work according to the MLC and keep all standards mentioned in it on the proper level, in this way ensuring good working conditions and decent remuneration for the labor of the seafarers.

The most important maritime labor regulating standard is the Maritime Labour Convention of 2006 developed by the International Labour Organization (ILO). As stated by Dacanay "As for seafarers, there are ILO conventions that govern their employment, like what should be the age of the seafarers, how long should they work in a day, what are their safety gears, etc." [20].

## **5. Conclusion**

Maritime industry is the most globalized field of human activity. Shipping companies located in different countries of the world, operate vessels flying different flags with multinational crews on board and all of this is regulated by the work of the IMO through its conventions and other regulating documents. Governments should take all these facts into consideration when developing strategy on such issues as supply, recruitment and protection of seafarers. Therefore, special attention should be

paid to the MET system of the country as it produces not only future seafarers but also specialists who will be able to give good advice to the government in the future on such questions as supply, recruitment and protection of seafarers of this particular country in this way contributing to the development of MET and the maritime field of the country. In this way, the country would ensure income, and all advantages the maritime field contributes to the economic development and state of the country.

**Institutional review board statement:** Not applicable.

**Informed consent statement:** Not applicable.

**Conflict of interest:** The author declares no conflict of interest.

## Abbreviations

<i>CoC</i>	Certificate of Competency
<i>CoP</i>	Certificate of Proficiency
<i>HR</i>	Human Resources
<i>IMO</i>	International Maritime Organization
<i>ISM Code</i>	International Safety Management Code
<i>MA</i>	Maritime Administration
<i>MET</i>	Maritime Education and Training
<i>METI</i>	Maritime Education and Training Institution
<i>METC</i>	Maritime Education, Training and Certification System
<i>MLC</i>	Maritime Labour Convention
<i>MTC</i>	Maritime Training Centre
<i>PESTELE analysis</i>	political, economic, social-cultural, technological, environmental, legal, ethical analysis
<i>SMCP</i>	Standard Marine Communication Phrases
<i>SWOT</i>	strengths, weaknesses, opportunities, threats
<i>STCW Convention and Code</i>	International Convention on Standards of Training, Certification and Watchkeeping for Seafarers
<i>WMU</i>	World Maritime University

## References

1. Mukherjee PK, Brownrigg M. *Farthing on International Shipping*. Springer Berlin Heidelberg; 2013.
2. Flin R, O'Connor P, Mearns K. Crew resource management: improving team work in high reliability industries. *Team Performance Management: An International Journal*. 2002; 8(3/4): 68–78. doi: 10.1108/13527590210433366
3. Sampson H, Zhao M. Multilingual crews: communication and the operation of ships. *World Englishes*. 2003; 22(1): 31–43. doi: 10.1111/1467-971x.00270
4. Knudsen F, Froholdt LL. The consequences of “culture’s consequences”: A critical approach to culture as collective programming applied to cross-cultural crews. *WMU Journal of Maritime Affairs*. 2009; 8(2): 105–121. doi: 10.1007/bf03195156
5. Edward S. Ebert C. Benteley M. “The Educator’s Field Guide: From Organization to Assessment, 2011, Corwin Press
6. Print M. “Curriculum development and design”, 2nd ed. Crows Nest, Australia: Allen & Unwin; 1993
7. Sandy T. Soto “An analysis of curriculum development”. *Theory and practice in language studies*, vol. 5, no. 6, pp. 1129–1139, June 2015.
8. Fisher D, Muirhead P. *Practical teaching skills for maritime instructors*, 3rd ed. Malmö: WMU Publications; 2013.
9. Available online: [https://en.wikipedia.org/wiki/Formative\\_assessment](https://en.wikipedia.org/wiki/Formative_assessment) (accessed on 17 August 2025).

10. Available online: [https://en.wikipedia.org/wiki/Summative\\_assessment](https://en.wikipedia.org/wiki/Summative_assessment) (accessed on 17 August 2025).
11. Emad G, Roth WM. Contradictions in the practices of training for and assessment of competency. *Education + Training*. 2008; 50(3): 260–272. doi: 10.1108/00400910810874026
12. IMO ISWG, STW 26/inf. Sub-committee STWC, 1994, London, IMO
13. Carson-Jackson J. A simulation instructor's handbook. Nautical Institute, London; 2010.
14. International Maritime Organization [IMO]. International Convention on Standards of Training, Certification and Watchkeeping for Seafarers 1978, as amended in 2010 (STCW Convention) and Seafarers' Training, Certification and Watchkeeping Code (STCW Code). IMO; 2011.
15. Davenport TH, Prusak L. Working knowledge: How Organizations Manage What They Know. Harvard Business Review Press; 2000.
16. Dalkir K. Knowledge Management in Theory and Practice. Elsevier; 2008.
17. Belias D, Koustelios A. The Impact of Leadership and Change Management Strategy on Organizational Culture. *European Scientific Journal*. 2014; 10(7): 1857–7881.
18. Katz JH, Miller FA. Leaders Getting Different. *OD Practitioner*. 2014; 46(3).
19. Beer M, Eisenstat RA, Spector B. Why Change Programs Don't Produce Change. *Harvard Business Review*. 1990; 68(6): 158–166.
20. Dacanay J, Walter D. Protecting precarious workers in the global maritime industry: a case of regulatory failure?. *Policy and Practice in Health and Safety*. 2011; 9(2).
21. Popma J. Does worker participation improve health and safety? Findings from the Netherlands, *Policy and Practice in Health and Safety*. 2009; 7(1):33-51. doi: 10.1080/14774003.2009.11667727
22. Bhattacharya S. The effectiveness of the ISM Code: A qualitative enquiry. *Marine Policy*. 2012; 36(2): 528–535. doi: 10.1016/j.marpol.2011.09.004