European Maritime and Fisheries Fund

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Maritime Logistics Engineering and Management

TRAINING DESIGN
(Report on Methods, Constraints and Criteria)

Deliver D3.1. - Report on Methods, Constraints and Criteria

Version 1.0

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1. Executive Summary

The main objective of this deliverable is to report the identification and assessment of the relevant constraints, methods and criteria regarding to Training Design in the field of Maritime Logistics Engineering and Management. It intends to list the relevant items which hypothetically constrain the training process and methods to meet the training needs, and relevant decision criteria as well. Several constraints have been identified: (1) Regulatory requirements imposed by legislation and regulations; (2) Organizational requirements; (3) Timing and scheduling requirements; (4) Availability, motivation and ability of individuals to be educated and trained; and (5) the availability of reputed and expert faculty.

Preliminary identified teaching methods are: (1) classroom presentations, discussions and problem solving; (2) business case and role play teaching methods; (3) gamification; (4) project-based learning and work-based learning; and (5) blended learning.

Suggested decision criteria are: (1) target group; (2) contents; (3) course length; (4) dates and locations; (5) facilities; (6) pricing policy; and (7) quality assessment.

A few recommendations are made at the end, namely: (1) the programme design should follow the framework of the European Qualification Framework; (2) benchmarking with comparable or reference programmes; (3) the need to have the programme' initial faculty trained on the *state of the art* concerning the relevant subject matters where applicable; and (4) keeping a close communication with the relevant industries, in order to input *the voice of the client* as a MarLEM programme's continuous improvement measure.

2. Contents

3. Introduction

Objective

The main objective of this deliverable is to report the identification and assessment of the relevant constraints, methods and criteria regarding Training Design in the field of Maritime Logistics Engineering and Management. It intends to list the main relevant items which may constrain the training process and the potential training methods to meet requirements.

Scope

The deliverable *D3.1 – Report on Methods, Constraints and Criteria* is related to the Tasks 3.1 to 3.2, which include the activities: (1) Constraints; (2) Methods and Criteria.

To reach the established objective, and having in mind the aim of the MarLEM project, concerning the development of a joint master programme in Maritime Logistics Engineering and Management, the project participants have been involved in analysing the relevant items, which may pose **constraints** to the training process.

Taking into account the situation analysis, in terms of competences required to respond to the end user needs and the listed constraints, it suggests the adequate training methods as well as the criteria for its selection and implementation. Being intended for

this programme to establish a <u>link between industry, authorities and academia, the knowledge triangle, and meet the requirements of the 21st Century Skills / Learning framework and the OECD Conceptual Framework for Education for 2030,</u> several **training methods** are suggested.

Description

The MarLEM project focused on the maritime industry lack of:

1) Entrepreneurial skills related with Logistics Engineering and Management;

2) Structured, defined and continued collaboration between industry and education/training;

3) "Skills ecosystems", at sea basin level, between education, industry and public authorities.

    To address the gap, the ultimate objective is to develop a joint Master programme in *Maritime Logistics Engineering and Management,* that is adjusted to Port and Maritime reality and <u>respect the conceptual framework of logistics, Industrial Engineering and Management.</u>

The programme will promote integrated engineering and management skills regarding a better supportability of port and maritime activities. The target are professionals already working in the maritime industry or related, as well as university students. The project attempts to ensure the certification of the Master programme according to EU regulations in the European Higher Education Area (EHEA), establishing a basis for programme transferability and replicability.

The principles of Quality Management (ISO 9001) and the requirements of the international standard on Training Management (ISO 10015) are present in the MarLEM approach. The 21st Century Skills / Learning framework and the OECD Conceptual Framework for Education for 2030 are main pillars for the training design, development and validation, including the soft-skills dimension.

The **purpose of this report** is to identify the relevant constraints, methods and criteria regarding Training Design, hence addressing the steps and actions stated within the scopes of tasks 3.1 and 3.2, during the first four months of project execution, and can be considered as a key input for the Training Planning and for the upcoming tasks in WP4 to WP6.

Based on the competence gaps identified in WP2, this report lists the relevant items which may constrain the training process; being the proposed training methods enablers that complete the gaps and needs of relevant stakeholders, specifically industry and respective authorities. The specification of main decision criteria addresses the potential issues to implement an academic programme that respects the defined methods, or combination of methods.

4. Constraints

A first approach has been taking shape in what concerns the identification of some envisioned constraints. However, the building of a world-class programme demands further research on the state of the art regarding some of the core training subjects in the proposed master programme, in order to overcome identified barriers.

Some identified categories that may potentially constrain the training development process at later stages have been identified, such as:

1) **Regulatory requirements imposed by legislation and regulations** – This regards the EU national high education certification body, *the Agency for Assessment and Accreditation of Higher Education* (A3ES), which certifies the Master programmes in Portugal, which shall be compatible across all EU Countries, through the European Qualification Framework.

2) **Organization requirements –** This category points to constraints such as those relating to human resources, organizations' perspective, and economical considerations. As a Master programme operating on a multiple-location basis, it may demand adequate economic funds (ideally self-funding) in order for students to be able to complete a certain course regardless of the location where it is being delivered.

3) **Timing and scheduling requirements** – As of now, and due to A3ES long approval cycle, together with the candidate education institutions, internal processes have to be planned with enough lead-time, which potentially demands designing the training specification in an agile manner.

4) **Availability, motivation and ability of individuals to be educated and trained** – this demands the specification of candidates' adequate selection criteria, in order to

ensure the programme's participants, have adequate backgrounds and can enrich classes with their experience and knowledge backgrounds.

5) **The availability of experienced and reputed faculty and industry experts** – This is a critical constraint as it directly impacts programme quality, legitimacy and prestige. It shall consider further advancement, by the faculty, on the *state of the art* on the subject matters. This point may demand <u>faculty sharing (or rotation) among the involved countries</u>. As an example, if Strathclyde University has an expert in a certain subject matter, it would be desirable for such expert to deliver the intended course or part of it, jointly with another faculty, in any location where the programme is being delivered, regardless. This suggests that the delivery format is a critical one with impact on quality and programme logistics; something addressed in the Criteria section of this report.

6) **Remote access** – Remote access would demand adequate ICT infrastructure, in order to allow for both, students to attend and, eventual speakers or lecturers to deliver classes in a remote way. Such capability would help in dealing with exceptional situations as would be the case of a pandemic driven isolation, which could potentially force the programme to run distance learning for some time period. This is a subject further addressed on the next section under the subject of methods.

There may be further resource constraints to be identified as the project progresses, which are not foreseen at this precise moment in time. Factors such as the availability of resources to deliver the training, as structured on a Project Based Learning and Work Based Learning approaches, or faculty experienced in case-based teaching method, are examples.

The list of constraints should be used in the selection of training methods and faculty, and for the development of the training plan specification.

To overcome such barrier, time and effort shall be taken into consideration at this stage in order not to delay the next phase, and particularly the demonstration phase. With time, a call is made on planning, and also potential funds to support MarLEM faculty development for the programme´s first-edition to run successfully.

5. Methods

The appropriate form of training will depend on the listed resources, constraints and objectives. Potential training methods to meet the training needs may include:

1) **Classroom presentations, discussions and problem solving** – In order to convey enough knowledge to the participants a traditional approach is used during the programme's initial courses, in order to facilitate the preparation of a master thesis.

2) **Business Case & Role Play methods** – Case based methods are well suited for experienced professionals attending the programme, where critical thinking, experience and argumentation may allow for a richer learning experience. Seemingly some soft skills subjects are better learned through the use of role play situations where the participants play a certain character under a certain situation, and has to make decisions. A post play debriefing typically closes the learning sessions. As this teaching methods demand better preparedness from faculty, a call exists for a criterion focusing in acquiring faculty experienced in theses teaching methods.

3) **Gamification** – Gamification using modelling and simulation has been for some time a popular technique of teaching Logistics and Supply Chain Management in order to increase perception in real Supply Chain, by taking decisions and observing the results of those decisions, and can also contribute for team building, which is an important soft skill. Gamification further develops decision making skills, especially within the context of supply chain, where multiple parameters and delays raises the level of complexity, as would be the cases of multimodal transport, or maritime transport and logistics, for example.

4) **Project Based Learning and Work Based Learning** – On the second part of the programme, intended to be more practical, a mentor oriented and project based with on-the-job coaching and counselling may be a good training method; where a project development occurs supported by problem-solving situations.

5) **Blended Learning** – A bended teaching methodology would allow for more flexibility in terms of both attending classes by geographically remote students, and the delivery of some classes by lecturers with specific expertise wherever they are in the globe. There is no substitute for face-to-face teaching, however, the blend mode represents a reasonable compromise. Moreover, if adequate ICT infrastructure is in

place, it would provide resilience during any physically isolation situation, as would be a case similar to the current pandemic state.

6. Criteria

To ensure its success and sustainability over time, the design of an academic programme must consider a set of criteria. Such criteria should be aligned with the needs of the potential recipients of the programme, taking into account the identified constraints and allowing for the application of the most appropriate methods as such.

In designing a training programme that responds to the end-users needs, namely industry and authorities, MarLEM methodology proposes to do a situation analysis. The conclusions and recommendations present in MarLEM *Deliver 2.1- End-user needs specification* are considered. Constraints previously identified are also considered in the programme design. Some requirements are mandatory because they have a legal enforcement and others are recommended. Another important item that the design should reflect is the methodology that best attains its objectives. Four main methodologies arise: Project Based Learning; Work Based Learning; case-based methods, and, potential gamification methods.

The main criteria that should be considered in the design of an international Master programme in Maritime Logistics Engineering and Management, aligned with MarLEM aims, are:

1) **Target group** – this master programme should focus on professionals in the maritime & port industry who wants to expand their knowledge, without closing access to newly graduate students who want to consolidate knowledge in this industry before entering the labour market. A minimum number of participants is of the essence to encourage the implementation of pedagogical methodologies that promote interaction and sharing of experiences among participants.

2) **Contents** – the programme should combine academic contents in the fields of logistics, engineering and management, with practical contents associated with the maritime-port industry. It should also be line up with the *XXI Century Skills / Learning approach* and with the *OECD Conceptual Framework for Education for 2030*.

3) **Programme and Course length** - considering the participation of professionals, the duration and schedule of classes is a critical decision criterion. The existence of

intensive and short periods of face-to-face classes and e-learning classes, combined with periods of students' autonomous work with flexible hours should be considered among the alternatives.

4) **Dates and locations** - face-to-face classes should be available in different periods and locations, in order to give flexibility to students. Classes ought to take place in areas with a strong establishment of maritime-port industry, enhancing the attraction of students and the interaction during the programme.

5) **Facilities** - the facilities should not limit the teaching process. The programme directorship must provide the necessary conditions to implement the different teaching methods. The proximity to the maritime environment can be an advantage.

6) **Pricing policy** - it must establish a balance between the potential students' expectations while covering programme operating costs, without compromising the programme objectives. The price policy shouldn't be a restrictive factor for the implementation of the best teaching practices, namely, to ensure the teachers proper training, the participation of invited teachers and industry professionals who add value to the programme or to permit the introduction of methodologies that expand content exposure.

7) **Quality assessment** - the programme must comply with the norms and principles in force in the European space, in order to achieve a quality assessment, as an evolving continuous process, and obtain certification.

7. Conclusions and Recommendations

Conclusions

Based on the **Situation Analysis**, the research team concludes, in particular on the importance of:

1) **Strengthening the training on 'hard' skills** –In general, countries are graduating more social sciences students than engineering ones. This is creating a gap between supply and a continued demand for graduates with engineering background.

2) **A strong component of soft skills** – Blending ´people skills´ with STEM skills in the same curricula is a non-traditional approach that may smooth business operations and transactions, promoting economic development.

3) **An integrated programme** – As suggested, MarLEM Professional Master Programme started by an in-depth analysis of industry skills requirements in order to provide a better match between its product and the ´end customer' <u>based on a community of practice composed by the stakeholders and their lessons learned database.</u>

4) **Intercultural and international** – the programme will benefit from the best of the contributions from different schools and institutions, with different technical backgrounds and cultures, which will provide several solutions for the same problem. This will promote the development of critical thinking, as well as soft skills, within the context of international business operations, where actors from different countries have to achieve joint solutions in a multicultural environment.

5) **Maritime component** – From the 50 biggest worldwide logistics operators, there are 17 with an ocean-going capacity beyond the other logistic elements, which stresses useful linkage of the general logistics, ports and maritime logistics elements.

There is certainly space for improvement concerning some preliminary suggested core courses, which will benefit from specific and focused training in key areas to bring and build on the state of the art, ending at better core courses.

Recommendations

Recommendations identified were:

1) The course design should follow the framework of the European Qualification Framework (EQF), by its international nature, as a common standard, which can be translated to the national's qualification frameworks, promoting mobility around Europe and facilitating lifelong education. The European Parliament and the Council of European Union adopted the EQF in 2008.

2) The training designing team should try to evaluate the actual benchmarking or state of the art in logistics teaching in order to integrate those ideas with the competitive advantages already possessed by the participants and their international culture, proximity with the end users and the authorities, and military logistics as well. This

whole contribution will allow the development of a premium programme based on the concepts of Industrial Engineering and Management adapted to maritime logistics context.

3) Allocation of a percentage of the available funds to support training design, in the form of future programme lecturers focused training – training that shall be very specific and not of broad scope (e.g. one-week intensive programmes in the relevant fields, where applicable). Once the current worldwide pandemic situation alleviates and travelling returns to some normality, this recommendation should take place ASAP in order to avoid any delay into the design phase.

4) MarLEM Partners should continuously enforce communication and networking with the industry in order to maximize the benefits of the linkage between the industry and the academia, which is not an easy task, culturally.

8. References

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