GAP ANALYSIS

Deliverable 2.1

Objective

To define the 21st century soft skills valued in the maritime industry, at different levels, and to compare those with the actual curriculum offered at three of the main maritime higher educational institutes.

Introduction

As discussed in The Annual Economic Report on EU Blue Economy 2018, the potential of the oceans to meet the demands of sustainable development is immense. Europe's maritime sector employs over five million jobs generating almost EUR 500 billion a year, with a potential to create many more jobs. A few years ago, 99% of all jobs could be classified under five broad areas: extraction of living marine resources, extraction of non-living marine resources, transport, shipbuilding, and tourism.

However, this landscape is changing. According to the 2018 Annual Economic Report on EU Blue economy, other emerging sectors start to fill the Blue Economy landscape, either because they are new or because they have become increasingly relevant due to macro-economic developments: renewable energy, blue biotechnology, deep-sea mining, desalination, coastal and environmental protection, marine defence and security, and marine research & education.

According to the Blue Growth document of 2012, as well as the work conducted by the Taskforce on Maritime Employment and Competitiveness, there is a need for actions in education and training concerning the facilitation of mutual recognition of skills and qualifications and better anticipation of skills and labour market needs. In addition, there is an urgent need to match available skills to labour market demand better. Fulfilling an identified need for fostering innovation in the maritime sector (including maritime technology suppliers) starts with focussing on influencing a new generation of maritime professionals that is yet to enter the labour market.

This is the reason why the wide spectrum of maritime orientated education institutions (i.e. vocational, bachelor, master programmes) can play a vital role in creating systemic change. Sustainable management, conservation, and balance of economic activity with long-term capacity, demand innovation and creative thought. Fostering the entrepreneurial mindset promotes not only innovation and creativity but obviously self- employment (Entrepreneurship in Vocational Education and Training, Final report of the expert group). These qualities are required for solving not only the problems of today but the foreseen and unforeseen problems of tomorrow.

However, the integration of design thinking and entrepreneurship into existing maritime curricula is one of the challenges for modern-day maritime educational institutes. This challenge demands a structured, permanent collaboration framework on innovation between the maritime industry and education. It is, therefore, necessary that maritime educators continuously engage in an open discussion with representatives of the industry and its stakeholders to decide on the priority competences to introduce in the training of future maritime professionals.

Objective

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Methodology

Information gathering

On the 9th of December 2019, the TEAMS consortium invited different representatives of the maritime sector for a symposium at Antwerp Maritime Academy, Belgium to discuss the importance of soft skills for maritime professionals. The attendees were invited to express their ideas of soft skills using a Wooclap question at the start, after which the theme was presented in a series of four short presentations:

- Raymond Hannes (PortXL), Sustainable growth through entrepreneurship
- Elena Van den Broeck (AP University College Antwerp), *Enhancing 21st century skills*
- Marnix Krikke (NMT), 21st century skills in the Maritime Industry
- Juha Ruuska (Tiimiakatemia, JAMK University of Applied Sciences), *Tiimakatemia (Team Academy): Learning Entrepreneurship by doing*

The audience was then invited to discuss their ideas on which soft skills are essential for maritime professionals. The outcome has been represented in a mind map.

The symposium was closed by a testimony from Harri Mustonen (Tiimiakatemia, JAMK University of Applied Sciences) entitled *My journey to team learning*.

Classification of soft skills

The soft skills identified in these discussions were catalogued according to the framework provided by Tiimiakatemia. This framework, developed at JAMK University of Applied Sciences, typically divides soft skills into seven categories: *Digital skills and IT*, Learning and research, Creativity and innovation, Leadership and management, marketing and sales, Business competences and Communication. This framework will be elaborated further in the Blueprint, to be developed in the rest of the TEAMS project.

Gap analysis

Each of the three maritime higher education institutes in the TEAMS consortium has then analysed its own curriculum and listed how these skills are taught throughout. This resulted in a gap analysis between the specific required soft skills by leading maritime-related companies and the way national maritime education institutions provide the development of these soft skills in their curricula. This forms the necessary baseline for the development of the TEAMS Blueprint, which will be developed in the next phase of the project.

Figure 1. Mind map as the outcome of the discussion at the TEAMS

Results: Identification of classification of soft skills for the maritime sector

The inventory of soft skills collected at the TEAMS symposium resulted in a list of 28 individual answers (listed in Annex 1) with surprisingly few repeats. The participants had the opportunity to "like" the answers of others, but few chose to do so, and these were not taken into account any further during this analysis.

During the breakout sessions at the symposium, these responses were debated further, in order to identify the proper definitions of each of the skills and to understand how the group as a whole connected the different answers into one coherent, communicable set of soft skills. Entrepreneurship was taken as a central point, although it was quickly concluded that none of the soft skills could really be discussed separately of the others. This interconnectivity formed the basis for the construction of the resulting mind map (Figure 1). The discussion (inspired by the different short presentations in the first half of the Symposium programme) helped to identify further how the audience viewed a specific skill, and where needed, the definitions were enhanced with extra descriptors

One of the categories in the Tiimiakatemia framework was not included. Digital skills did not show up in discussion with the maritime stakeholders, and the maritime educators felt that digital skills, as acquired during maritime diploma work, should be considered specific, hard skills for maritime professionals as well Therefore, though important for any entrepreneur, they have been left out of the analysis presented here.

Comparing the outcome of the TEAMS symposium

At the symposium, the comparison was made with the Skills Navigator Project. This is a project subsidised by Interreg Flanders-Netherlands (https://www.skillsnavigator.eu) in which a study was conducted on soft skills requirements of employers in various sectors, including the maritime sector. Some of the results were presented at the TEAMS symposium and are very comparable to the outcome presented here. Both lists are comparable for most parts. The combined list of soft skills (Table 1) sought after offers a good overview of the soft skills which are relevant to the maritime industry.

Table 1. Soft skills in the maritime sector, as identified on the TEAMS symposium, and compared to those identified in the Skills Navigator project. The classification was done according to the Tiimiakatemia framework.

	TEAMS	Skills Navigator
Learning and Research	Initiative Adaptability Flexibility Open mind Curiosity Personal resilience Optimistic Self-confidence	Initiative and self-management Flexibility Willingness to learn Result-oriented
Creativity and Innovation	Critical thinking Creativity Innovation culture Problem-solving/decision making	Critical thinking Creative and innovative thinking Problem-solving skills
Leadership and Management	Organisational environment Teamwork Leadership Convincing People management Multidisciplinary teams Team resilience Team roles	Planning and organising Cooperation Inspiring and coaching others
Marketing and sales	Professional in selling your product Innovators/stakeholders	
Business competences	Safety awareness Responsibility	Global awareness and safety Responsibility Environmental awareness and sustainability Financial and economical awareness
Communication	Interpersonal skills Communication Emotional intelligence Ethical awareness	Intercultural skills Communication skills

Gap analysis

It is important to note that the partnering institutions offer different levels of education. Within the STC Group, training sections range from secondary education (STC MBO) to a higher educational bachelor's degree (STC HBO). The NMCI provides educational courses for obtaining a bachelor's degree as well as professional course modules. In turn, the AMA offers both a bachelor and a master's degree. This variation in student population should be taken into consideration when comparing the observed gaps.

GAP ANALYSIS - ANTWERP MARITIME ACADEMY (AMA).

1. Learning and Research
   Although **self-management** is covered in the curriculum, there is a need to improve on discipline and self-confidence and enhance ownership of learning.
   Personal resilience is considered as a significant gap that includes not only stress management but also the ability to persevere and be positive about the future despite eventual setbacks. The latter is evidently related to the (further) development of self-confidence, which should be a focal point in treating soft skills.
   Flexibility is not addressed as such, nor is its managerial counterpart, change management. Even if some STCW codes or learning outcomes may refer to it indirectly, the need for flexibility deserves to be made explicit for two reasons. First, it is a necessary mindset to deal with the rapid changes and evolutions humans have to deal with in today's society and the maritime sector in particular. Secondly, the hierarchy on board and the procedural character of maritime labour both tend to create an impression of rigidity and immobilism. It is, therefore, essential to provide maritime students with tools that enable them to operate changes within this work environment.

2. Creativity and innovation
   Problem-solving and **critical thinking** are embedded in the curriculum and do not need separately focusing on since they are transversal skills which will be addressed in all the other topics or sets of soft skills.

3. Leadership and management
   Team resilience is the only skill which is neither covered by the STCW codes or by the learning outcomes. Parallel to personal resilience, it will need to be introduced and developed. **Decision making** and **taking initiative** are both represented in the STCW codes but lacking in the learning outcomes. This indicates there is room for improvement or higher practice of these skills. The Antwerp stakeholders have mentioned the lack of initiative by cadets performing internships. Here again, students have to be taught how to develop initiative in a hierarchical and procedural environment.

4. Marketing and sales
   As expected, **professional selling** and **knowledge about a sales environment** are absent from the curriculum and need to be introduced. **Situational awareness** is only included

at a micro-level of the watch and bridge operations. It needs to be expanded to a more global or macro level and not restricted to the ship and its surroundings. Students have to be taught how to gain this knowledge and make use of it. Again, this is a more transversal skill that can be trained while addressing other sets of soft skills.

5. Business competences
Financial and economic awareness, a core entrepreneur skill, is part of the curriculum but needs to be developed. Both knowledge on these aspects of the maritime industry and the ability of making use of it are crucial to acquire for maritime students.
Although **risk management** is also a hot topic in the maritime industry and education, the practice of it should be reinforced. The ultimate goal is to create a safety mindset and a routine that continually assesses the potential risks involved.

6. Communication
Although **communication** is considered to be an essential STCW competence and is focused upon in the current curriculum, innovative teaching methods or different approaches could help students take ownership in finding more efficient and suitable communication styles. This is also valid for **interpersonal skills**. They may be addressed in the STCW competencies and learning outcomes but need to be overall trained. Students need to acquire a deeper understanding of others and one's personality and the ability to act upon that knowledge.

GAP ANALYSIS – STC ROTTERDAM

1. Learning and research
Concerning the development of **self-management** skills, the identified gap varies depending on the educational level. For students of STC MBO, there is an explicit need to gain more understanding of the topic and to increase awareness on one's performance and limitations. Although students of STC HBO are considered more proficient in this matter and able to apply self-management within incident investigations, the scope of application could be broadened.
Reflecting on procedure follow-up and handling of emergency situations is a competency that should be encouraged more. Elaborating specific tools to help students achieve this level of reflective thinking would be beneficial.
Training of **personal resilience** is currently incorporated in non-compulsory courses (Shell training). Still, it should be promoted more widely throughout the whole curriculum so that all students gain more knowledge of this essential skill.

2. Creativity and innovation
Problem-solving and **critical thinking** are embedded in the curriculum for the bachelor level and do not need separately focusing on since they are transversal skills which will be addressed in all the other topics or sets of soft skills. For the vocational level this subject is part of the newly developed competence profile, and as such needs to be developed into the new curriculum.

3. Leadership and management
Despite the fact that **teamwork** is crucial onboard, the curriculum does not address this skill sufficiently. Training of softcore skills to promote effective collaboration with crew members could greatly be improved. **Decision making** and **taking initiative** are present in the higher education curriculum (HBO) by means of training on simulators and working on research projects and case studies. Notwithstanding, being key entrepreneurial skills, their application could be broadened outside the ship/work environment.

4. Marketing and sales
Situational awareness focuses predominantly on ship specific operations. Although training on marine environmental awareness (by ProSea) has been introduced to address the evolving aspect of the maritime sector and encourage students to think innovatively, the **commercial** aspect of the shipping industry needs to be emphasised.

5. Business competences
Except for basic knowledge on security risks, no specific courses are dedicated to investigating the **financial or economic implications** these risks might entail. Gaining insight into this is essential for students to increase their **global awareness** and develop the much needed 21st century skills to stay **competitive** in a rapidly changing job market.

6. Communication
It is undeniable that communication is a key competence to acquire and thus already very embedded in the curriculum. But while it is mostly conversational communication that is put into practice, the equally important non-verbal communication aspects are often omitted. A gap can thus be identified in the more **interpersonal** elements of communication.

GAP ANALYSIS – NATIONAL MARITIME COLLEGE of IRELAND (NMCI)

1. Learning and research
Even though **self-management** and **personal resilience** are covered theoretically in several courses of the curriculum, a focused and much more practical approach is required to achieve better command of these skills. Students would benefit greatly from classwork, where positive peer review takes place. With learning by doing students will get a better grasp of learning concepts and eventually take more ownership of their intellectual development.

2. Creativity and innovation
Problem-solving and **critical thinking** are embedded in the curriculum and do not need separately focusing on since they are transversal skills which will be addressed in all the other topics or sets of soft skills.

3. Leadership and management
   This area for **teamwork**, **decision making** and **taking initiative** is extensively covered in various simulation courses where students have to lead, manage and use soft skill to achieve their mission. There is no gap as such but rather room for improvement and an opportunity to redesign teaching tools.

4. Marketing and Sales
   A significant gap has been identified. There is a need for technical guidance and expert advice on this topic in order for students to understand the implications on revenue (availability of grants, tax implications) and to gain awareness of the changing industry.

5. Business competences
   Students develop risk awareness of security, health, and safety through elementary risk assessments. Adding a project management element would help demonstrate the complexity of **risk management** and encourage students to adopt an investigative mindset that integrates all aspects of the industry.

6. Communication
   This skillset is covered throughout the college experience. Nonetheless, greater elements could be added concerning human relationships and interactions on board. Respect for individuality, values and cultures could, for example, be more accentuated.

Conclusions

When investigating the explorative analysis from the three partner institutions, comparable gaps can be identified. The topics regarding Sales & Marketing and Business Competences reveal a considerable hiatus in all the curricula. Being essential entrepreneurial skills, the need for implementation is obvious.

In contract, the other established topics are certainly covered in the various curricula but seek further development and modernisation. The sharing of ideas, coaching methods and overall knowledge of the maritime industry will greatly benefit all the institutions and help forge educational facilities at the forefront of teaching 21st century skills.

Annex 1: Wooclap responses at the TEAMS symposium

Question: What are "soft skills" in a maritime context?

Answers were slightly edited to account for spelling errors and, in one case, after clarification during the discussion.

Answer	Likes
1. Teamwork	0
2. Resilience	0
3. Just culture	0
4. Communicate with innovators	0
5. Not from book wisdom but rather by "learning by doing". Within the group of skills, I consider soft skills as 'social skills'	1
6. Human skills, behavioural skills, people management skills, social and emotional intelligence, maritime: MRM 1	1
7. Critical thinking	1
8. Adaptation to a changing environment	1
9. The ability to communicate comprehensively across linguistic and cultural borders and interpret communicative behaviour. The ability to lead a group, motivate every member and provide a safe mental and physical working environment. The capacity of empathy, analytical, synthetical and critical thinking	0
10. Psychological safety	0
11. Emotional intelligence	1
12. Interpersonal skills	1
13. Teamwork	1
14. Leadership	0
15. Innovation of the Maritime industry in terms of communication, resource management and leadership	0
16. The ability to work with others, including peers, supervisors, and subordinates. The ability to lead, to take direction, and to communicate clearly and effectively	0
17. Working and living on board, with colleagues	0
18. Bearing responsible for ship and crew	1
19. Founder mentality	1
20. Skills needed to be able to connect different stakeholders in the maritime sector!	1
21. Besides skills knowledge and experience a mindset that supports creative thinking and innovation and a holistic approach that includes the human, societal and environmental issues in the challenges of the maritime sector.	0
22. People Management	1
23. Initiative	0
24. Teamwork	3
25. Communication	2
26. Creativity	1
27. Critical thinking	1
28. Open-mindedness	0