

TEAMS white paper

Deliverable 5.4

Alco Weeke (STC) / Annette Opstal (NMTF)



Foreword

The Annual Economic Report on EU Blue Economy 2018 and the IMO GHG Strategy 2050 show that the maritime industry faces a huge challenge. Both current and future seafarers will need to adopt new skills to match new labour market demands better to meet the environmental challenges. The European Commission identified these issues and launched the EMF Blue Economy Call. The TEAMS project is one of the awarded projects within this call.

The project Teaching Entrepreneurship Advancing the Maritime Sector (TEAMS) has been designed to develop a method to implement entrepreneurial skills in maritime education.

Fostering the entrepreneurial mindset promotes innovation and creativity, and obviously, self-employment. These qualities are required for identifying and solving not only the problems of today but also the foreseen and unforeseen problems of tomorrow. However, integrating 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 for innovation between the maritime industry and education.

Therefore, maritime educators must continuously engage in an open discussion with representatives of the industry and its stakeholders to decide on the priority competencies to introduce in the training of future maritime professionals.

Fulfilling an identified need for fostering innovation in the maritime sector (including maritime technology suppliers) starts with focusing on influencing a new generation of maritime professionals yet to enter the labour market. This is why the broad spectrum of maritime-orientated educational institutes (i.e. vocational, Bachelor, and master programmes) can play a vital role in creating this systemic change.

This Whitepaper provides a guide to start with design thinking and entrepreneurial skills in different levels of maritime education, based on the results and lessons learned from the TEAMS project. Furthermore, the Whitepaper offers recommendations to governing bodies and educational institutions to aid the implementation of entrepreneurial skills in the curricula, therewith enlarging the impact of this method on future seafarers. All reference material can be found on the [TEAMS website](#).

On behalf of the [TEAMS partners](#), we wish you a pleasant reading.

**Alco Weeke
Annette Opstal**



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Summary

The project Teaching Entrepreneurship Advancing the Maritime Sector (TEAMS) has been designed to develop a method to implement entrepreneurial skills in maritime education.

Fostering the entrepreneurial mindset promotes innovation and creativity, and obviously, self-employment. These qualities are required for identifying and solving not only the problems of today but also the foreseen and unforeseen problems of tomorrow. However, integrating 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 for innovation between the maritime industry and education. Therefore, maritime educators must continuously engage in an open discussion with representatives of the industry and its stakeholders to decide on the priority competencies to introduce in the training of future maritime professionals.

At different levels, the 21st-century soft skills valued in the maritime industry were identified and compared to the actual curriculum offered at three European maritime educational institutes¹, resulting in a gap analysis. This showed that the existing STCW-related learning goals in current curricula lack entrepreneurial skills and design thinking competencies. Further, a Blueprint was developed based on entrepreneurship teaching principles that offer and foster this design thinking and entrepreneurship. Fourteen Lecturers from these institutions were trained to become TEAMS coaches, expanding their expertise in experiential learning and coaching to train 60 students sustainably to become “Teampreneurs”. The TEAMS Blueprint was executed and piloted with the newly trained TEAMS coaches on different educational levels of students to prove the method and the tools. Involved maritime companies assisted in developing

real-life cases, offering students generic or specific challenges in sustainability and digitalisation. Using real-life cases and the possibility of presenting solutions to actual companies has proven to rocket students' motivation to succeed.

This Whitepaper highlights the methodology, results and lessons learned from the TEAMS project. Furthermore, the Whitepaper offers recommendations to governing bodies and educational institutions to aid the implementation of entrepreneurial skills in the curricula, therewith enlarging the impact of this method on future seafarers.

¹ The maritime educational institutions involved in the TEAMS project are:
- AMA Antwerp / Antwerp Maritime Academy
- National Maritime College of Ireland (NMCI) and Munster Technological University (MTU)
- STC Rotterdam hereafter referred to as Antwerp, Cork, and Rotterdam



Due to the difference in EQF-level in the participating educational institutes, only one proof of concept per level resulted. Nevertheless, the TEAMS partners take pride in the results obtained and prove the added value of the method and tools used in general and for the identified target groups: lecturers, students, and maritime companies.

To name a few results:

- The TEAMS coaches all wish to expand the use of the TEAMS method within their classes and motivate more teachers/lecturers to use this method, given the added value in comparison to conventional teaching methods
- The coaching method and tools put students in charge of their learning path and rockets motivation. Students have proven to be able to think critically and pose well-informed questions
- The cooperation with maritime businesses has provided real-life cases and more interesting, innovative course material. In return, real-life challenges are an excellent means for maritime industries to present their challenges and innovations to future seafarers and learn from their practical experiences.

By using real-life cases and the Blueprint tools and method, maritime students learn to 1) investigate product innovations, 2) decision making based on product specifications and 3) obtain information by consulting manufacturers and make an informed decision based on critical thinking and entrepreneurship. The Blueprint tools are needed to maximise the innovative vigour of students and future seafarers.

Maritime businesses receive feedback on future users' useability and operability onboard vessels. This will lead to a faster and more effective implementation of innovations. The future crew will learn to embrace innovation and make well-informed choices.

The inclusion of soft skills, such as creativity, critical thinking, design thinking, networking, business modelling/planning, and entrepreneurship within the STCW framework, should be considered for students to be aware and informed of the latest innovative development of maritime equipment suppliers. Also, the Blueprint method and tools need to be included in the education of maritime lecturers to provide innovative skills to teach innovatively.

See the [TEAMS website](#) for all the information.

Fostering entrepreneurial skills in maritime education

Integrating 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.

Therefore, maritime educators must continuously engage in an open discussion with representatives of the industry and its stakeholders to decide on the priority competencies to introduce in the training of future maritime professionals.

The gap analysis aims to define the 21st-century soft skills valued in the maritime industry at different levels and compare those with the curriculum offered at three foremost maritime higher educational institutes.

The gap analysis of 21st-century skills in the maritime educational curriculum within three North-sea basin countries was made. It showed that the existing STCW-related learning goals in current curricula lack entrepreneurial skills and design thinking competencies. After the gap analysis, a Blueprint was developed based on entrepreneurship teaching principles that offer and fosters this design thinking and entrepreneurship. Fourteen Lecturers from three maritime educational institutions were trained to become TEAMS coaches, expanding their expertise to train 60 students sustainably to become "Teampreneurs".

The TEAMS Blueprint was executed and piloted with the newly trained TEAMS coaches on different educational levels of students to prove the method and the tools.



The TEAMS project addresses the acceleration of innovation in the maritime sector from three different perspectives:

1. By stimulating design thinking² and entrepreneurial skills³ with 60 students in different maritime educational levels, incorporating relevant 21st-century skills into existing curricula.
2. By providing maritime lecturers/ teachers with the skillset needed to become coaches and to incorporate the method into actual courses
3. By creating a structured, permanent collaboration framework for innovation between the maritime industry and educational institutions.

The active involvement of the maritime industry in the pilots in all three countries has led to a sustainable network and exchange of innovative cases. Furthermore, the TEAMS project has resulted in a TEAMS toolbox which contains the course and assessment materials for replication and adaptation by other EU maritime educational institutes. The white paper proposes multilateral and national organisations adopt changes in international agreements such as STCW and national regulations regarding 21st-century skills development in maritime curricula.

2 Design thinking is a non-linear, iterative process that teams use to understand users, challenge assumptions, redefine problems and create innovative solutions to prototype and test.

3 Entrepreneurial skills are the skills needed for a sharp end user to stay in control when working with innovative solutions onboard of ships. A great entrepreneur must be able to effectively communicate, sell, focus, learn, and strategize. A gap analysis of these entrepreneurial skills in maritime curricula was executed revealing a considerable hiatus on the aspects Sales & Marketing and Business Competences in all the curricula.

Methodology

Practice-oriented research was conducted by the three participating educational institutions containing a gap analysis. Soft skills of the 21st-century and entrepreneurial skills needed by leading maritime-related companies were compared with how national maritime educational institutions currently provide them (self-analysis).

A mini-conference was held in which representatives of the maritime industry from Belgium, Ireland, and The Netherlands met with representatives of maritime educational institutions of these countries to discuss and identify this gap. This resulted in a published [GAP-Analysis](#) of the specific 21st-century skills required by the maritime industry, gaps in maritime education offerings regarding these skills and a set of recommendations to prioritise these soft skills in the curricula of maritime educational institutions.

Based on the [Team Academy](#) approach to educating entrepreneurial competencies of the Finnish [JAMK University of Applied Sciences](#), a [Blueprint](#) was developed, which was implemented in and/or added to the curricula of the maritime educational institutions involved, ensuring the essential 21st-century skills for the maritime industry, like creativity, critical thinking, design thinking, networking, business modelling/planning, and entrepreneurship.

This Blueprint was executed in Antwerp, Cork and Rotterdam to test the method and the suggested tools on different educational levels and in different manners.

A group of teachers from all participating educational institutions have been trained to adopt a pedagogical approach to coaching and the tools to carry out experiential learning. By doing so, the educational institutions can independently and sustainably coach project teams in their academies with entrepreneurial skills and institutionalise the TEAMS Blueprint within their educational system in the future.

All three educational institutions executed the Blueprint within their school. In Antwerp, on Master level (EQF 7), in Cork on Bachelor level (EQF 6) and Rotterdam on VET (EQF 4) level. Per institution, a group of students was coached by the TEAMS coaches in the development of innovative ideas, proposals and business cases.

This has resulted in a proof of concept of the TEAMS Blueprint and the delivery of Teampreneurs from three North-sea basin countries.

Involved maritime companies (represented among others by [PortXL](#) and [Netherlands Maritime Technology Foundation](#) (NMTF)) assisted in developing real-life cases, offering students generic or specific challenges in sustainability and digitalisation. Using real-life cases and the possibility of presenting solutions to actual companies has proven to rocket students' motivation to succeed. The assembly of all challenges became a [digital casebook](#) for future reference for other maritime educational institutions or TEAMS coaches.

The real-life cases have been executed in projects by students in three different ways and on three different levels of education (VET, Bachelor and Master Dual Licensed Maritime Officer) in three different countries.



In Antwerp, the TEAMS method has been tested on the Master level. The experiments were targeted to apply new pedagogical methods focused on coaching and experiential learning of students instead of the traditional teaching method. The Master's students undertook a more knowledge-driven half-year project. They researched a case study in marine insurance, worked in a team and engaged maritime companies. This resulted in a paper on the topic.

In Cork, at the Bachelor level, the TEAMS Blueprint manual was integrated into an existing module over ten weeks. The cohort of students who participated in this project were first-year marine engineering and ETO (Electro Technical Officer) students. They were introduced to different concepts and tools related to entrepreneurial soft skills within the maritime industry. These skills were built up every week, with milestones to be met, i.e. the completion of three projects:

1. A CV and cover letter for a job in the maritime sector
2. A career development plan for the next ten years
3. A group design project to solve a real-life problem

The group of students also participated in a teambuilding and leadership event.

In Rotterdam, on the VET level, the target was to design and execute a "project week" that offered several coaches (including Port XL) the possibility to experiment with the TEAMS methodology and students to experience design thinking. The main goal was to gain power skills (entrepreneurial soft skills, non-technical skills).

By creating a single online platform for the TEAMS Blueprint and the execution thereof, we bring exposure to a broader public. The portal functions as a means for the industry to show its openness to entrepreneurial thinking and student involvement.

The project partners evaluated the results, lessons learned and recommendations from all three institutions in the [evaluation paper of the Blueprint](#). Furthermore, these results are incorporated in this Whitepaper for governing bodies and other maritime educational institutes interested in adopting entrepreneurial teaching.

Results

Thorough analyses of the best possible options per country to implement the TEAMS Method resulted in different approaches in the different schools, each fitting the class/course schedule and level of education the best.

There is no “one size fits all” approach to implement the TEAMS method. Different levels of education, the study year, different course schedules, but also the characteristics of maritime studies (onboard versus in school) call for a tailor-made implementation of the TEAMS method.

AMA Antwerp

In close consultation with maritime businesses, six cases were identified and used. Each case reflected different maritime incidents, each with specific insurance features, for which specific knowledge and skills needed to be deployed by the students. AMA has taken on the approach to use these cases in a setting outside the Master curriculum (EQF 7), as these better fits the yearly schedule. The cases were elaborated by groups of students and followed the TEAMS Blueprint. These cases were not a part of the regular curriculum, and groups were coached over a period of time. The results have been used to evaluate the Blueprint and refine the real-life cases and case questions in the casebook.

The coaches reported that students experienced improved better learning results using this method. Although it is worth mentioning, there was some initial resistance by the students to perform using this “new approach”.

MTU Cork:

After careful consideration, it was decided the best approach to introduce the TEAMS method was to make the selected real-life cases part of an existing teaching module. In doing so, the focus was placed on implementing the TEAMS method, fostering design thinking and entrepreneurial skills for the students and coaches, rather than adopting a contest format, as was mentioned in the Call. MTU addressed three real-life cases which focused on sustainability issues in a joint effort with local maritime businesses for this course module. Different groups of students worked on elements of these cases. The experiences of the coaches and students of the Ordinary / Honours degree (EQF 6) have been used to evaluate the Blueprint.

“ *Coaching is daring to let go of your own fear, leave your comfort zone and trust the process.* ”

Camille Debandt / Lecturer HZA

STC Rotterdam

STC Group hosts multiple maritime studies from vocational education to Masters. It was decided to test the TEAMS Blueprint via a project week, including a contest for third-year students Dual Licensed Officers (STCW, EQF 4). All the students had recently returned from their six-months apprenticeship on board a vessel. STC has used the “homecoming” week and “return to college life” and transformed this into a practical project week. In a joint effort with partners NMTF and PortXL and a large number of maritime businesses, twelve real-life cases were assembled. Six of these have been selected for the project week. Maritime businesses associated with these real-life cases were actively involved this week, primarily for interviews (peers). Some were active in workshops, on-site visits and/or present at an actual pressure cooker case. Although the COVID-19 pandemic caused some alterations to the program due to travel restrictions or quarantine, the contest was a great motivational driver for these vocational education students. The contest results have been used for evaluating the Blueprint and improving the real-life cases for this specific level of education.

The TEAMS project partners have therewith experienced three methods of implementation:

- Outside the curriculum;
- As part of a course module;
- As a separate project week and a contest.

The results of the TEAMS project are listed below, in general, and identified for three target groups;

- Coaches (in addition to the study and educational institute);
- Students;
- Maritime businesses.

“ *Coaching takes more time than conventional lecturing, but the results are more efficient. For the students, but also for the coaches. As coaches, we share experiences with other coaches / colleagues and feel more supported.* ”

Kathy Speelman / Lecturer HZA

“ *The TEAMS project is a sure “add-on” to the pedagogic methodology in VET-education. Especially the own learning process of the students. We are used to guiding and teaching them, but sometimes forget they are well capable of designing their own learning path.* ”

Willem Busz / Coach STC

TEAMS coaches (lecturers)

- The TEAMS coaches all wish to expand the use of the TEAMS method within their classes and motivate more teachers/lecturers to use this method;
- The cooperation with maritime businesses has provided real-life cases and more interesting innovative course material at the Master level;
- By integrating the TEAMS method in a course module, design thinking and entrepreneurial skills become anchored in maritime education at the Bachelor's level;
- The TEAMS method has proven to be an innovative approach to foster design thinking for maritime education and may also be used in other projects ([Skillsea](#), [Maritime Delta Student Challenge](#));
- The TEAMS method changes the interaction between teacher and student. Whereas the teacher becomes a coach, the student develops more responsibility but also more engagement in the profession;
- Involved teachers reported being convinced about transforming their teaching and reported that this way of teaching was more fulfilling than conventional teaching methods.

“ The maritime industry is full of risks and rewards. In the context of risk, these can be mitigated against by the use of soft skills, for example effective communication, good leadership, good decision making and having the ability to critically think about issues, both technically and human.

In the context of rewards, the maritime industries growth rate in recent years particular in the areas of offshore wind, alternative fuels and supply chain are offering maritime students increased career opportunities for example gaining employment in existing companies or creating their own business.

From an educational perspective it is now even more important for maritime teachers / coaches to be able to equip maritime students with “new” skillsets so they can take full advantage of reducing risk and gaining greater rewards. ”

Daniel Manning / Lecturer/coach NMCI

“ I learned about the development of business ideas and entrepreneurship. It was like nothing I had ever done before and it was a great experience and I feel I learned a lot from it. ”

Alain Gordet / Bachelor student NMCI

Students

- A repetitive project week is a good way for VET students to develop the needed skills;
- VET students have proven to be able to think critically and pose well-informed questions;
- The vast majority of the VET students indicated they appreciated the attitude of maritime professionals and felt being taken seriously with all their ideas, even though they were novices in the field;
- At the Bachelor level, the design project promoted group/teamwork within the class and involved the ability to compromise, plan and delegate. Different design solutions were taught through the use of creative tools. The project also fostered the student's presentation skills, both electronically and physically;

- Nearly 80% of the Master's students (strongly) agreed with the statement that they learned more and in a better way during the group work than they would have learned in a regular course;
- The involved Master students acknowledged they so far lacked the skills for group work and preferred to start the TEAMS method earlier in the study to benefit maximally and acquire these skills;
- Over 70% of the Master's students indicated that the TEAMS assignment had triggered them to learn more about the case study topic.

“ Apply this method of working earlier in the study. This can then become a habit and certainly improve the way of learning. ”

Maarten van Rossum / Master student HZA

“ The TEAMS project was a new way of learning. Which in my opinion is better than just getting the theory and afterwards an exam. In this project you learn more because you have to search for your own information and have your teammates to explain you things or to reflect on information. ”

Jasper Brugmans / Master student HZA

Maritime businesses

- The TEAMS method is of added value for cooperation with maritime educational institutions and fosters the needed skills among students while introducing the industry's real-life challenges;
- The real-life challenges are an excellent means for maritime industries to present their challenges and innovations to future seafarers and learn from their practical experiences.

“ Learning to do interviews was pretty hard. The pitching gave us useful skills for the future and while working in a group we learned to trust each other. The project was nice, educational and exciting. ”

Winners of the STC project week contest

4 See the [Blueprint Evaluation](#)

Generic results⁴

- Evidence-based proof that the TEAMS method can be applied in vocational education;
- Evidence-based proof that tailor-made and more knowledge-driven challenges are of added value for Bachelor's and Master's level;
- Maritime businesses wholeheartedly welcome the TEAMS method and support fostering future seafarers' design thinking and entrepreneurial skills;
A sustainable platform to exchange ideas and knowledge regarding the industry's challenges with educational institutes is viable;
- A true comparison between the TEAMS method by the project partners is impossible due to the different levels of education. The TEAMS project has resulted in only one proof of concept for each level.

“ In a half-day design thinking cycle the students were able to come up with great ideas to improve the dashboard on the bridge. This helped the designers to improve the information presented on the dashboard. The data shown will assist seafarers to be able to make more informed decisions to sail as sustainable as possible. Participating in the STC project week has proved to be refreshing, tremendously inspiring and fun! ”

Teus van Beek / Gen. Manager Ecosystem Innovation at Wärtsilä Netherlands

“ The design project was an excellent opportunity for our first-year engineering and ETO student to engage with a real-life design problem.

The project not only engaged our students on the design thinking/creative element of the project but it also required them to form teams, learn how to communicate with each other, find common ground on the ideas they created and then present their concept to me in a united front.

The teams blueprint and this design project provided our students with specific entrepreneurial soft skills, which will benefit the students as they travel through their college journey and into the maritime industry both nationally and internationally. ”

Mr Cormac Gebruers / Head of NMCI

Recommendations

Please find below recommendations based on the results and lessons learned from the TEAMS project partners for the three identified target groups. Please consider these and, if applicable, take appropriate actions.

- 1. To educational institutes:**
 - Other European maritime schools should consider using the TEAMS method and Blueprint to train teachers to become a coach and apply the method in maritime education;
 - For VET students, the project partners recommend using the TEAMS method several times a year so students obtain a higher level of skills and training in design thinking;
 - By using real-life cases, maritime students learn to 1) investigate product innovations, 2) decision making based on product specifications and 3) obtain information by consulting manufacturers and make an informed decision based on critical thinking and entrepreneurship;
 - The Blueprint tools are needed to maximise the innovative vigour of students and future seafarers;
- 2. To maritime businesses:**
 - The VET and Master students have benefitted most from the TEAMS method and procedure. For the Bachelor level, project-based or case-based education is more common.
 - Company products and innovations are displayed to future seafarers by providing real-life cases to educational institutes. In return, businesses receive feedback on future users' useability and operability onboard vessels. This will lead to a faster and more powerful implementation of innovations;
 - Shipping companies should want their (future) crew to be trained on the TEAMS method by TEAMS coaches; what impact will all these innovations have on the operation and organisation? At current, shipping companies purchase proven technology but hardly innovate themselves. The TEAMS method will teach the crew to embrace innovation and make well-informed choices.
- 3. Authorities (e.g. [IMO](#) and [IMLA](#))**
 - Take into consideration the inclusion of soft skills, such as creativity, critical thinking, design thinking, networking, business modelling/ planning, and entrepreneurship within the STCW framework, as well as maritime innovation by showing proof to EMSA that students are aware and informed of the latest innovative development of the maritime equipment suppliers. By addressing these issues in the STCW standards, a global level playing field for all future seafarers is attained;
 - Consider including the Blueprint method and tools in the education of maritime lecturers to provide innovative skills to teach innovatively.



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Author(s) Alco Weeke (STC), Annette Opstal (NMTF)
Dissemination Public
Coordinator NMTF
Work Package WP5 – Dissemination, sustaining and evaluation of the TEAMS Blueprint

