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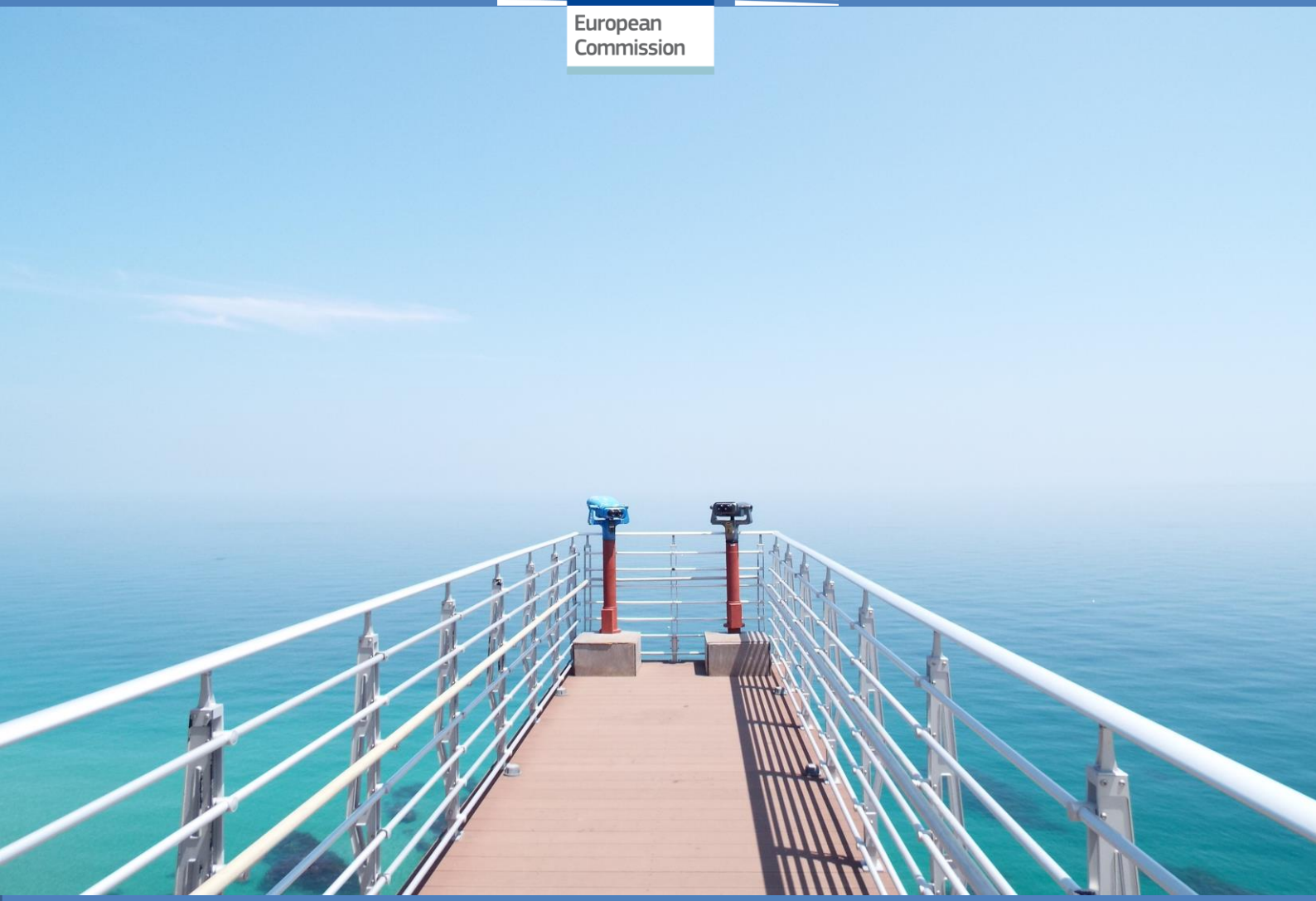

Lifelong learning, mobility and new training programs in the blue economy

Best practices and user stories

Maritime Affairs and Fisheries

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The expert group

The best practices collected in this document come from members of the Informal Expert Group on Skills and Careers Development in the Blue Economy, set up by the Directorate-General for Maritime Affairs and Fisheries (DG MARE) in 2016. The task of the Expert Group is to advise the Commission on matters pertaining to education, training, and skills and career development within the blue economy. As key stakeholders in the sector, their input for closing the skills gap in the Blue Economy in Europe is vital. The document is structured on an Expert Group member basis and readers should feel free to contact relevant experts for further information about these best practices.

Disclaimer

All experts have provided consent for their contact information to be made public. For further information about the best practices in this document please contact the relevant expert.

All views expressed are those of the authors and not necessarily reflect the views of the European Commission

Foreword

The Blue Economy is evolving fast, here in Europe, as in the rest of the world. Maritime activities across the board have benefited from high-tech advances. Digitalization and globalization have presented welcome opportunities and unforeseen challenges.

Whether in established sectors like shipbuilding or tourism or in emerging ones like ocean energy or marine biotechnology, new methods have meant new growth.

And this means that the skills and competences required of workers change over time. We need to help people keep up with the pace of the modern world. Educational institutes and industry need to join forces and develop appropriate schemes for life-long learning and for mobility across the blue economy. Those teaching and learning methods must be constantly updated to reflect new disciplines.

For several years now the EU has been promoting lifelong learning and mobility through a variety of programmes - all aiming, like the stories in the booklet, to make the European work force cutting-edge, inclusive and labour-market ready.

Karmenu VELLA

Commissioner for Environment,
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In 2016 SEA Europe, together with our social partner industriAll Europe jointly took the lead in creating a **European Skills Council** to more effectively anticipate the need for skills in the maritime technology sector and achieve a better match between skills and labour market needs. The Skills Council also aims to identify best practices and innovative ways for promoting LLL and mobility. More info: http://www.seaeurope.eu/Publications-Brochures/140712

Given the lack of LLL sector oriented public programmes companies need to provide training on site to ensure that workers have adequate skills. As an example, **Royal IHC in The Netherlands is a shipyard operates its own school** to address the skills requirements of the workforce. The company offers a 2-year welding and ironworking education programme to approximately 30 people every year. The Netherlands Maritime Academy is an initiative of seven companies and SEA Europe´s Dutch member, Netherlands Maritime Technology (NMT). In the frame of the Academy, the members are delivering training courses available to each other's employees. By opening the training courses to each other, knowledge is shared and companies can benefit from each other's expertise. NMA provides LLL to employees of participating companies who can re-train and upskills themselves through specific training that is relevant for their activities. Since January 2018 NMA is open to other companies.

GICAN, SEA Europe´s member in France, launched the **French Naval Campus** in 2012 to provide an effective structuring of "bottom-up" training paths for specific skills required by the naval industry (from operator to engineer) with professional (and when possible, international) certificates, as well as to promote careers.

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In collaboration with the Nippon Foundation, POGO established the **NF-POGO Centre of Excellence (NF-POGO CofE) in Observational Oceaongraphy**, to invest in young researches from all over the world by providing a forum for training, networking and exchange. Now hosted by the Alfred Wegener Institute for Polar and Marine Research, NF-POGO CofE is an intensive training course for young professionals at the post-graduate level, with an intake of ten trainees per year. Scholars receive ten months of training to include one month of formal introductory training, followed by more detailed courses on corse skills and specialised scientific topics such as modelling, remote sensing, ocean-atmosphere interactions as well as training in instrumentation, sample collection and analytical protocols. They also conduct an independent research project during the programme.

As part of the NF-POGO CofE, a Regional Training course is conducted each year in a host country. These intensive courses provide 2-4 weeks' training on specific topics relating to observational oceanography. Past Regional Training Programmes have been held in Brazil, Vietnam, India, the Philippines, Mexico and Ireland.

Following their training, all NF-POGO scholars are invited to join the NF-POGO Alumni Network for Oceans (NANO), which is organised into Regional Coalitions. The aims of the network are to maximise the benefits to the alumni from the training they have received; facilitate active contacts among the alumni and with the training faculty; and promote joint research activities that will build on the training.

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Since 2016, SOIB has been developing a **Dual Training Program in collaboration with Blue Economy Companies and VET centres**. The program aims to qualify unemployed youth (aged 16-29), as well as match SME skills needs on nautical maintenance, engineering, painting, carpentry and general maritime industry supply.

SOIB develops an annual call for proposal and finances training, tutor expenditures and hiring cost of youth. It also monitors learning and quality processes, issues official certification of professional qualification acquired by participants, checks legal requirements and coordinates stakeholders.

Both SMEs and VET centres must meet specific criteria to qualify for the program. SMEs must contract youth for a minimum of one year, while VET centres must offer training programs linked to the National Catalogue of professional qualifications, which equip students with a set of skills, knowledge and attitudes defined by employment authorities.

This partnership allows students to receive both theoretical and practical training in professional branches of the maritime and fishing industry, as well as transport and vehicle maintenance. The over-500 hours of training plus the work experience gained by students highly increases the probability of participants receiving an open ended contract in the industry. The Professional Certificate they receive can also be transferred to the educational system, boosting return to school by early leavers.

In 2017, the program has allowed 58 participants to be hired and become apprentices, with the involvement of 25 SMEs, 7 yacht clubs and 3 VET centres.

The European added value lies in the transferability of major features of the German dual training system to a Mediterranean archipelago reality, including the participation of SMEs, also with capital from other European countries. This initiative is relevant because it addresses the Council recommendation on establishing a Youth Guarantee as well as the Communication from the Commission on Blue Growth. Finally, it is linked to the recent initiative launched by the Commission for the sustainable development of the Blue Economy in the western Mediterranean.

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The university set up **CEIMAR (Campus of Excellence of the Sea)**, a cluster of 14 research institutions with three main axis dealing with a) teaching and talent attraction, b) research and development, with emphasis on applied science closed to the production structures, and c) divulgation, marine literacy and communication to the society.

Concerning lifelong learning, mobility and new training programs, CEIMAR has launched the **International Doctorate School for Marine Studies (EIDEMAR)**. Four Doctorate programs (PhD) are offered from this school: PhD on Marine Science and Technology, with a joint doctorate degree with Ferrarra University (Italy) called EMAS (Earth and Marine Science); PhD on Management and Conservation of the Sea; PhD on Maritime History and Archaeology; and PhD on Marine Resources.

At Master's level, CEIMAR offers the **joint interuniversity Master on Oceanography offered together with Universities of Vigo and Las Palmas de Gran Canaria**. The cluster has also initiated a *Masters' Degree in Nautical and Underwater Archaeology*. Other Masters' Degrees of interest include Integrated Management of Coastal Areas, Maritime Transport, Oceanic and Naval Engineering, Maritime History, Archaeology and Heritage, the Erasmus Mundus in Water and Coastal Management, Aquaculture and Fishing, Conservation and Management of the Environment, Civil Engineering (Roads, Canals and Ports) and Renewable Energies and Energy Efficiency, among others of a broader disciplinary nature (from Tourism to Environmental Education, including legal and economic disciplines), covering the broad spectrum of marine-maritime disciplines.

The *agenda* of postgraduate training activities is projected expertly abroad, particularly, through the **International Summer School**. The ISS offers specialised international training modules, courses of international excellence, sporting and cultural activities, language courses and other programmes for the public; being an agent to attract international talent to EIDEMAR. The activities of the *International Summer School* are set up in a multi-campus format, with teaching programmed and delivered in English.

Find out more at:
www.eidemar.com
https://masteroceanografia.com
www.arqueologianauticaysubacuatica.uca.es
http://internationalsummerschool.uca.es

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Aquaculture International published a Special Issue: *Advances in Teaching and Learning in Aquaculture*, edited by M. Eleftheriou and S. Seixas, which described the work carried out on a pan-European scale by the **ERASMUS Thematic Network AQUA-TNET.** The consortium has also contributed to the publishing of various academic articles amongst others on positioning lifelong learning in aquaculture; generic skills needs for graduate employment in the aquaculture, fisheries and related sectors; student mobility measures in the aquatic sciences at all educational levels; and more (see links below).

Furthermore, the Consortium facilitated the **WAVE Leonardo da Vinci** project (Working in Aquaculture-Validation of Experience). The project targeted the entire aquaculture industry in Europe (including workers, employers, SMEs, trade associations, colleges and training organisations). The consortium conducted 150 interviews with a range of aquaculture personal in 90 fish farms in 11 European countries and was thus able to identify and map the skills and knowledge needed for work in the aquaculture sector. The result of this bottom-up approach was a Master List of European Aquaculture Competencies, a catalogue of 248 competences regarded by the industry as comprising the essential skills, competences and knowledge needed for aquaculture production.

The Master List can be and has been used by different target audiences for different purposes and in this respect anticipated by several years the ESCO approach. It's been used by producers, farm managers, training organisations, regulatory, awarding bodies, HE and VET students and job seekers at different levels.

Another project, **VALLA (Validation of all Lifelong Learning in Aquaculture)**, demonstrated how to validate and recognise short-term sectoral training (including non-formal learning). The VALLA Consortium provided an occupational and functional map for the sector using a competence-based approach. They then examined how such competence-based learning can be evaluated and validated and made recommendations as to how short-term training can be awarded with credits. VALLA subsequently developed a methodology, dedicated software and supporting protocol to help trainers describe those learning experiences suitable for recognition within the existing EQF and NQF systems. The project's added value for Europe was that through high stakeholder participation (over 100 members including higher education institutes, industry, research organisations and representative bodies), over 20 case studies were produced. These in turn enabled the Consortium to draw conclusions on how sectoral training could fit into the existing EQY and NQF systems.

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As a worldwide operating educational and research institution, the STC Group is a one stop shop for education and training related to the shipping, logistics, transport and process industries. The STC Group furthermore offers business courses and training for professionals. When students have graduated for their regular education programme, they can come back for **retraining, upskilling or refreshment courses**.

In some industries, this is already mandatory, e.g. maritime crew members have to renew certain certificates every couple of years. For other industries, retraining or upskilling is not a mandatory requirement. However, courses are often developed in cooperation with and on request of the industry. An additional advantage of this structure is that knowledge which is obtained by providing courses for upskilling is flowing to the regular education to prepare youngsters for a job in the industry.

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Two different projects (**TRECVET & TCC-SCV**) looked at the problem of lack of recognition between EU Countries for similar SCV qualifications. The TCC-SCV project produced a methodology that resulted in a European Common Core qualification between seven EU Member States and to allow for any differences between these national qualifications, presented a range bolt on modules to allow for cross border exchange. The project work led to an invitation from and cooperation with ICF to co-write "The Assessment of the Impact of Business developments improvements around Nautical Tourism".

Furthermore, the Erasmus+ project **SUSSWATER** (Sustainable use of water based resources) involving Sweden, Ireland, UK and Norway enables students and teachers at upper secondary level to meet up in the participating countries. Through workshops, visits, poster sessions and minor work experience they learn how water based resources is used and managed around Europe. This can be issues like aquaculture, hydropower stations, leisure time activities, opportunities and challenges.

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A Aixola Training Centre was founded in 1997 by the Regional Government of Galicia, with the aim to offer courses to fishers who left the sector and wish to pursue their careers in the maritime sector again. Since its foundation, the Training Centre has provided courses in the areas of timber, composites, electricity and mechanics on-board, sails, pneumatic boats, fishing nets, and technical plastics (polyethylene and polypropylene). It also offers guidance in the creation of new businesses, job searches, help with resumes and counselling.
Trainings are non-academic and are periodically adapted to the labour market needs and trainees' demand. This approach gives people who are not able to access other trainings due to academic requirements a chance to learn a job; it also leads to the creation of heterogeneous groups in which mutual learning among students is spontaneously developed. All trainings have practical orientation for acquiring the skills required in the labour market, through workshop learning and working with real materials (like boats borrowed from local entities). The training centre emulates the work of the companies with a teacher-tutor and a group of apprentices in each specialty. The theoretical training necessary for the development of these specialties is mostly integrated in the practical classes.

CETMAR Foundation is in charge of the management of the centre since 2004. Since its creation it has been funded with Regional Government funds, the European Financial Instrument for Fisheries Guidance (FIFG) and the European Maritime and Fisheries Fund (EMFF). On average 14 free technical courses are taught per year, complemented by accessory training in the areas of employment and acquisition of basic skills (some students require extra classes to catch up with the technical learning). This totals about 4000 teaching hours aimed at an average of 165 students per year. Regarding the social profile of the students, a high percentage is at risk of social exclusion: 80% are unemployed, 6% are over 55 years and 14% are under 24 years. 28% have a low level of education (primary studies or school graduation), and the vast majority have an intermediate level of education (25% secondary graduates, 27% vocational training and 14% bachelor), and 20% of students are women.

Since 2014, there has been a 74% rate of job placement, while 35% of students continue to be trained. The orientation of Aixola's activities affects four of the eleven thematic objectives of the European Union to achieve smart, sustainable and inclusive growth; it falls directly into 3 of the priorities of the EMFF and pursues 4 of the 11 specific objectives of the ESF.

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The World Maritime University (WMU) in Malmö, Sweden, is a postgraduate maritime university founded by the International Maritime Organization (IMO), a specialized agency of the United Nations.

Established by an IMO Assembly Resolution in 1983, the aim of WMU is to further enhance the achievement of objectives and goals of IMO member states through education, research, and capacity building to ensure safe, secure, and efficient shipping on clean oceans.

In 2017, the University launched a new **Ocean Institute**. The institute will be formally inaugurated in May 2018. The Ocean Institute is a concrete response to the UN Sustainable Development Goals, and in particular Goal 14 that commits governments to 'conserve and sustainably use the oceans, seas, and marine resources for sustainable development'. It is intended to be the independent focal point for ocean-science-policy-law-industry interface acting as a convener and convergence point, where policy-makers, the scientific community, regulators, industry actors, academics, and representatives of civil society meet to discuss how best to manage and use ocean spaces and their resources for the sustainable development of present and future generations, supported by evidence-based research, educational programs and capacity building. Research outputs of the Institute will enhance capacity of all stakeholders to implement legal requirements and policies. A special emphasis is being placed on working closely with the IMO and other relevant UN organisations, including UNESCO.

The work of the Institute will augment the existing postgraduate (MSc) course in Ocean Sustainability, Governance and Management. This course/specialization is one of seven courses offered by the University in the maritime and ocean domains. The MSc courses run for 14 months, starting in September each year and are funded via fellowships from international donors and governments, as well as self-funded students. The university also offers PhD programs in the ocean and maritime domains. Each year, approximately 50 countries are represented by the incoming MSc class. WMU's 4654 alumni are from 167 countries and occupy senior oceans and maritime administrative and decision-making positions in their countries. Given the nature of the oceans, the University believes that this global approach significantly enhances the dialogue and knowledge about ocean sustainability.

Find out more at:
www.wmu.se

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The **Strategic Marine Alliance for Research and Training (SMART)** is an inter-institutional, collaborative marine education and training cluster based in Ireland, which aims to develop capacity in offshore operations. Established in 2011, the SMART cluster is funded by partners including the Marine Institute, the Higher Education Authority and five Higher Education Institutions. Partners also pool infrastructure, facilities and expertise to offer practical, accredited, research vessel-based training for third level students of marine science, technology and engineering. These activities support the growing marine sector by producing experienced and skilled ocean professionals, capable of working at sea and contributing to the Blue Economy.

SMART courses are multi and transdisciplinary and address key disciplines including oceanography, benthic ecology, fisheries biology and geosciences. This multidisciplinary ecosystem approach is aimed at producing graduates with an understanding of complex marine systems who can investigate, understand and sustainably manage our future oceans. Teaching focuses on the practical, cross-disciplinary skills and competences involved in operation of equipment and instrumentation, sample acquisition and processing data acquisition, basic processing and integration. Other elements essential in operating at sea are addressed including safety at sea, survey design and planning, post-survey analysis and assessment.

SMART trains over 300 undergraduate and postgraduate students at sea annually in areas such as Multidisciplinary Offshore Operations, Geosciences and Seabed Mapping, Offshore Energy and Communications, Advanced Marine Technology and Marine Renewable Energy. Internationally, SMART has also fostered strategic partnerships across Europe and globally and joint collaborative postgraduate courses have been delivered on European research vessels in Norway, Estonia, Italy, Germany, and Denmark.

The SMART training model, which provides access to world class research infrastructure and instrumentation, combined with an array of inter-institutional, accredited courses, delivered by a dedicated team of on-board experts is unique globally. This cost effective model of practical, seagoing training adds considerable value to third-level marine education in Europe and is key to developing capacity in the blue sector.

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During the years 2007 and 2008, several projects in the field of Renewable Marine Energy (RME) were emerging within our cluster (PMBA). It was a strong indicator to assess an effective take off of this industrial field in France. The involved companies were mainly coming from shipbuilding, offshore O&G and onshore RE industries. Working with the partners, PMBA discovered that the experimented people coming from these fields may have some gaps in their knowledge to have a broad enough view of the RME scope. To get a complete view on the challenges related to RME issues, one must be aware of the structural design at sea, the loads, some ideas about electrical engineering as well as being able to understand other fundamental aspects as impacts on the environment, sea behaviour modelling, usage conflicts, acceptability, how to calculate an LCOE, etc.

So it appeared obvious within the management board of Pole Mer Bretagne Atlantique that hosts both academics and industry stakeholders, that this emerging industrial sector will need specifically trained people at the highest possible level. So a discussion was initiated over 2008 and 2009 and was clearly facilitated between both parties ensuring an efficient collaborative approach that allows the design of a tailor made post master's degree that fulfil industrial needs. The various academic actors from western Brittany region started thinking about how they could manage to address this challenge. Finally a specific program was built during late 2009, leading to a **specialised Master course in Renewable Marine Energies**. The first students were selected and the first year started in September 2010.

The training is targeting project or program managers dedicated to the development of energy production systems and farms at sea. The one-year program starts with a three week refresher course, is followed by six months of lectures, and is concluded with 5-6 months of internship or project practice. The program offers several field trips to technical and industrial sites. The major partners include the French Naval Academy, IMT Atlantique (Graduate School specialized in digital technology, energy and environment), the Western Brittany University and Ifremer (French Research institute for marine sciences). Today, the program has issues almost 80 diplomas and more than 90% of students have found a job in the field of renewable marine energies. Around 10% of the graduates are working abroad, in countries like Ireland, Scotland, The Netherlands, and the United Kingdom. Finally, around 10% of the graduated students decided to continue their studies by joining a PhD program.

Find out more at:
http://www.ensta-bretagne.eu/index.php/advanced-master-in-renewable-marine-energies/

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SUSSWATER is an Erasmus+ project running from 2016 to 2019, involving Sweden, Ireland, the UK and Norway. The project focuses on water-based resources and the use of these in a way that can simultaneously increase the industrial use and at the same time be sustainable in all aspects. Students and teachers at upper secondary level meet up in participating countries and through workshops, visits, poster sessions and minor work experiences they learn how water-based resources are used and managed around Europe.

This strategic partnership aims to stimulate innovation for the students and instructors to improve students' work opportunities. It also aids industry by promoting the value of work-based learning, with a specific project focus, developing educators' competences, expanding the vision for future learning opportunities and broadening participation for all.

SUSSWATER introduces water-based resources in education centres in regions in Europe that have a coastline, and point out how these can be utilized in a better way when it comes to food production. The project aims to stimulate an increased interest for education in the sustainable use of natural resources, and add a positive marketing feature of the aquaculture industry as a central part of the bio-economy.

The project will establish links between schools, education centres and the aquaculture industry, increasing the formal cooperation of school and industry for a more updated and realistic education within relevant areas.

Find out more at:
www.susswater.com

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DLTM facilitated the creation of a **2nd level Master course FORTEMARE in System Engineering for Maritime Technologies**. The course was designed in cooperation with the University of Genova (Electrical, Electronics and Telecommunication Engineering and Naval Architecture Department), R&D centres, industry (SMEs and Big Enterprises), the General Confederation of Italian Industry (Confindustria Genova), the National Conference of Equal Opportunities Committees of Italian Universities and DLTM to meet the training and innovation requirements emerging from nine national R&D projects.

It offers specialization in managing and optimization, design lifecycle planning and design strategies with specific skills concerning complex system management, risk analysis and decision-making. The Master aims to train professional figures who can fit into the research and innovation of industrial sectors. Given the structuring of the training path, the acquired technological and management knowledge have the widest values typical of the "Systems of Systems" (SOS) problem, and provide the tools to operate in broader areas related to "Homeland Protection" and "Homeland Security", such as air traffic control, VTS (Vessel Traffic System) control systems, national security systems etc. The course provides knowledge also useful for the design of simpler systems that are developed with the help of ICT technologies. The outgoing figures will find a place in the labor market as System Engineer for Maritime Technologies and Project Manager.

Find out more at:
https://www.perform.unige.it/master/masterfse/master-system-engineering-fortemare.html

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