MariePRO - Promoting Maritime ECVET Actions

Survey report on syllabus differences between maritime VET institutions in partner countries: Finland, Germany, Italy, Malta and the UK

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2016

Co-funded by the Erasmus+ Programme of the European Union

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Context / Aims of MariePRO and the survey report

The vocational education and training ([i]VET) in the maritime field is regulated by the International Maritime Organization's IMO International Convention on Standards of Training, Certification and Watchkeeping for Seafarers ([ii]STCW). The Convention aims to provide universal regulations for maritime education, qualifications and watchkeeping – at least in reaching the minimum requirements. Despite of the international STCW Convention, there are major differences between different countries - and VET institutions - regarding the content and structure of maritime education and training ([iii]MET). The fact that there is no universal system of MET has led not only to substantial discrepancies in learning outcomes at national and institutional levels but also to differing systems of certification for seafarers applied by individual member States of the [iv]IMO; the training in some States surpassing the STCW requirements and in others barely meeting the minimum standards; differing programmes of study (curricula) at MET institutions across the world; a lack of uniform systems of accreditation for study programmes within MET institutions and different types of competent bodies in charge of national MET and organizational structures between MET systems and national educational systems.

The ECVET Recommendation places special requirements on vocational education and training. The purpose of the Recommendation is to create a European Credit System for Vocational Education and Training (ECVET) to facilitate the transfer, recognition and accumulation of assessed learning outcomes achieved in formal, non-formal and informal contexts by individuals who are aiming to achieve a qualification. The transnational recommendations and regulations deriving from different sources do not leave the maritime field in particularly advantageous position. As revealed in the MariePRO project survey, MET actors in some countries find themselves in a challenging situation facing questions such as whether implementing international standards risks lowering national standards, or whether the current national educational framework stands as a barrier for educating competent seafarers. The MariePRO – Promoting Maritime ECVET Actions project aims to smooth the way for MET institutions to integrate the demands deriving from the STCW and international rules and regulations together with the European ECVET Recommendation towards more transparent and comparable learning outcomes.

The MariePRO partner consortium includes universities, vocational training institutes and MET actors from Finland, Germany, Italy, Malta and the UK. The partners involved in the project include Centre for Factories of the Future (UK), ITTL Nautico San Giorgio (IT), Mediterranean Maritime Research and Training Centre (MT), University of Bremen, Institute Technology and Education (DE), and University of Turku, Centre for Maritime Studies (FI). The current report presents the MariePRO project findings on transnational comparisons in VET/MET based on desktop surveys, discussions and conclusions of workshops for MET actors in the partner countries, as well as the results of an interview questionnaire for maritime VET actors in different countries. The areas examined include: the overall framework of MET, i.e., maritime institutes and training Programmes as well as curricula of maritime institutes (incl. responsibilities & processes of planning), and other aspects relevant to maritime education and training, i.e., process of certification to become an officer, onboard

training practices, e.g., who issues and who assesses the certificate. These aspects were examined against the national framework of education (incl. traditions & beliefs) and the VET structures and practices of the individual countries. The summary report concludes with the views of MET actors on the need for and their visions of harmonised maritime education and training.

The scope of MET Programmes examined includes both, (initial) vocational education and training [(I)VET] and higher education (HE), that is, MET voperational level studies at vi European Qualification Framework (EQF) levels 4-5 and management level studies at EQF levels 6-7. The main focus is on operational level studies since, due to the viiBologna reforms, national HE-systems have much more in common than VET-systems; HE is based on modules and uses the viiiECTS system.

MariePRO project is funded by Erasmus+ programme of the European Union. In Finland CIMO, the national agency for the European Union's education and youth programmes, administers and is responsible for implementing the Erasmus+programme. The European Commission accepts no responsibility for the contents of this publication.

Maritime education and training within the national framework of education

The maritime education programmes need to satisfy the IMO STCW requirements including all mandatory safety/ancillary courses such as fire-fighting as well as recently required courses such as Maritime Resource Management (MRM) and Engine-room Resource Management (ERM). The maritime programmes, depending on the country, either include the IMO certificate(s) of competency concerned, or eligibility for the certificate concerned is provided for the students on completing their studies. The operational level studies involve STCW A-II/1 officer in charge of a navigational watch and/or A-III/1 engineering officer of the watch certificate(s), and the management level studies involve the IMO certificate A-II/2 of masters and chief mates or A-III/2 certificate of officers in charge of an engineering watch.

Based on the experience of several other projects', transnational comparisons or common outputs in VET are only possible if current structures are taken into account; as VET regimes and the beliefs of relevant stakeholders differ widely; from neo-liberal, tailor-made supply in the English VET system to holistic, long-lasting apprenticeship Programmes in countries like Germany. Furthermore, to develop a common unit or to increase transnational mobility, not only the structures but also the content of the VET profiles in the participating countries must be considered.

In Europe three main approaches of structuring VET exist:

1. Standardized curricula; all VET students in a country learn the same with holistic examinations at the end. This approach is pre-dominant in central-European countries with school-based VET systems like France or Poland.

2. Modularized approaches: Content of all sectors is formulated into modules resp. units; each training provider is free to design their training offer by choosing from

these modules (must be reasonable; and is controlled by national authorities). Units are assessed separately. This approach is pre-dominantly in the Anglo-Saxon countries.

3. Internal flexibility: Curricula are standardized in terms of content, but not in terms of time spent (i.e. level of competence reached) on them. This approach is predominant in apprenticeship-based VET systems like Germany to ensure participation of companies (standardized curricula would overburden specialized companies); it respects the vocational principle and refers to holistic examinations.

The following presents an overview of the national educational framework of each of the partner countries examined in this survey report, i.e., Finland, Germany, Italy, Malta and the UK. Reference to the above mentioned three approaches is made, and the MET system is introduced within the national VET framework of each of the country cases.

Italy

Italy, as an example of the standardized curricula approach, has a secondary school system made up of a five year cycle (youngsters of 14-19 years), with the vocational education starting in the early stages of the system. A view on VET Programmes reveals, however, that the topics on specific field chosen are started only at the age of 16. This is because the first two years of secondary school are general, whereas the other three years, the last one in particular, are geared towards students gaining quite deep knowledge in their particular field, as well as gaining skills directly applicable in the world of work; the learning on-the-job approach is widely applied.

Vocational training in Italy is divided into two paths: professional training providing practical competences in mainly handicraft-related areas, and technical training providing practical competences but also deeper theoretical knowledge in economics and technology related areas. The Ministry of Education sets the competences to be reached during vocational education and training (national guidelines), but every school is partially free to determine its own study path in terms of knowledge and skills (local curricula). The secondary school ends with a national exam, after which students get a diploma at the EQF level 4, having three further possibilities: start working without any additional training; continue their vocational training in an ITS (Istituti Tecnici Superiori), where, during a two year study path, long term on-the-job training is provided and at the end the students get a qualification at the EQF level 5; start a university course to reach the EQF level 6 (3 years) or EQF level 7 (5 years).

In Italy, MET is taught starting in the third year of secondary school in ITTLs (Istituti Tecnici dei Trasporti e Logistica) that are part of the technical area of vocational training. Students having completed successfully the ITTLs can start working on board as cadets, or can try to enter one of the three existing ITSs (Istituti Tecnici Superiori) located in Genoa, Gaeta and Trieste, providing MET at EQF level 5 (access is under severe selection); ITSs offer a two year long study path that alternates ground based lessons and onboard training in order to allow students to collect the necessary 12 months of onboard service to become officers. Students that haven't attended the ITTL can have the same possibilities after an alignment course (500 hours) or after having completed a three year course (EQF level 6) in a maritime

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university. There is only one maritime university (Parthenope) in Italy, located in Naples, providing MET at EQF level 6 (bachelor's degree).

The content of the ITTL MET programmes do not totally cover the topics prescribed by the STCW and don't reach the required number of teaching hours, as set by the IMO model courses: ITTL programmes cover the basic navigation and engineer subjects (about 75 % of the STCW) such as, taking the deck department as an example, coastal navigation, nautical astronomy, choice of the route (rhumb line vs great circle), nautical charts and publications, an overview on the bridge equipment (compasses, radar, ECDIS, GNSS, etc.), theoretical aspect of meteorology and oceanography, ships' structure, ships' stability, theoretical aspect of a loading plan and the basic safety, security and environmental issues.

The training provided by ITSs completes the STCW requirements, for example with the part about manoeuvre, going even far beyond the minimum requirements.

The fact that the training provided by ITTLs is not enough, aggravated from the lack in the provision of technological facilities (i.e. bridge simulator) for the most of the (too many) 53 ITTLs in Italy led to the decision of the Ministry of Transport that will probably take place with some laws expected to enter into force in the next months, to make mandatory 36, rather than 12, months on board for the students holding the ITTLs diploma, before they can become officers; in fact, only students from ITSs will take the benefit to carry out the minimum period (12 months) as cadets.

The UK

The UK's Vocational Educational Sector developed independently of central (or devolved) government control. As such the sector has grown large and unwieldy.

It is important to note in this report that education in the UK is a devolved matter in Scotland and so education policy may differ.

According to the registry of qualifications held by the UK's qualifications regulator - Ofqual - there are approximately 13,000 Vocational/Technical/Professional qualifications currently available to students across England, Wales and Northern Ireland (Education is a devolved policy area in Scotland). The register can be reviewed here: http://register.ofqual.gov.uk/Search?category=Qualifications&sort=-None&filters%5B0%5D=status%2BAvailable%20to%20learners.

The qualifications are designed and accredited by over 160 organisations across the UK including:

- Awarding Bodies
  - City and Guilds
  - Pearson / BTEC
- Charitable Organisations
  - VTCT (Vocational Training Charitable Trust)
  - NOCN - National Open College Network

- Professional/Industry Bodies
    - CICM (Chartered Institute of Credit Management)
    - AAT (Association of Accounting Technicians)

The current qualifications on the Ofqual register range from Level 1 through to Level 8 in the UK's Regulated Qualification Framework (https://www.gov.uk/what-different-qualification-levels-mean/compare-different-qualification-levels). The qualifications are delivered through either 'taught' approaches or an 'apprentice' approach - depending on the individual qualification requirements or the colleges/schools preferred delivery method.

Although the approximately 13,000 Vocational / Technical / Professional qualifications are designed by over 160 bodies they are usually delivered by one of 4 types of organisations:

- Secondary Schools
- General Further Education Colleges
- University Technical Colleges
- Universities

Schools

Any school (state or non-state) can choose to offer additional Vocational / Technical or Professional Qualifications to their students alongside the traditional academic subjects. The Vocational / Technical / Professional Qualifications can range in level, credit and course length and so can fit whatever is best for the school in terms of their resources to deliver the qualification.

As there is no government requirement to provide specific Vocational / Technical / Professional Qualifications as part of the national curriculum many schools choose not to provide any Vocational / Technical / Professional Qualifications qualification at all. As such it becomes part of the 'post code lottery' whether a child will attend a school that offers Vocational / Technical / Professional qualifications.

General Further Education Colleges

Post-16 colleges across the UK offer a mix of academic and vocational / technical / professional courses. Vocational qualifications delivered by GFE colleges can be delivered in a 'taught' format or through an apprenticeship and can cover anywhere between qualification Level 1 to 8 and be worth up to 420 credits.

The 'taught' format' is where the qualification is lecturer led and content taught primarily in the classroom and assessed through exams and coursework.

The Apprenticeship model is based around the pupil being either in work or training for a minimum of 30 hours per week. The pupil will either be working at their 'sponsoring company' in a real position with real responsibilities, or they will be in college learning the theory and taking the exams to pass their qualification.

There are 4 different qualification levels an apprentice can study for depending on the requirements of the company:

Apprenticeship Name	Apprenticeship Level	Equivalent educational level
Intermediate	2	5 GCSE passes at grades A* to C
Advanced	3	2 A level passes
Higher	4,5,6 and 7	Foundation degree and above
Degree	6 and 7	Bachelor's or master's degree

https://www.gov.uk/apprenticeships-guide/overview

All vocational / technical / professional qualifications offered by GFE Colleges should be registered on Ofqual's qualifications register to ensure a quality qualification is being delivered, however as awarding bodies themselves this is less of a requirement for GFE Colleges as they can design their own qualifications.

University Technical Colleges

UTC's are specifically designed to cater for around 600 students aged 14-18 yrs. Each UTC will focus specifically on a technical or specialist area e.g. Engineering, Manufacturing Technologies, Product Design, Digital Technologies etc. The pupils will study and gain Vocational qualifications in the colleges' specialist area alongside their academic subjects (e.g. mandatory Maths, English and Science at Level 1 - 2 gained at age 16 and a free choice of subjects at higher qualification levels at age 18).

All vocational / technical / professional qualifications offered by UTC's should be registered on Ofqual's qualifications register to ensure a quality qualification is being delivered, however as awarding bodies themselves this is less of a requirement for Colleges as they can design their own qualifications.

There is also the opportunity for some students to register as an apprentice once they reach 16 years of age.

Universities

Traditionally Universities design their degree qualifications and then search for links and equivalencies in vocational qualifications in order to add additional value to their degree, for instance for many years the University Undergraduate degrees could be split by year so that if a student left after year 1 they would still receive a Higher National Certificate (HNC, level 4), after two years they would receive a Higher National Diploma (HND, Level 5) and after the full 3 years a Bachelor's Degree (BA / BSc, Level 6). In recent years this has shifted to Universities offering Foundation Degrees (Level 5) to students to study in their first year and then depending on their grades students can progress to the full degree course.

As well as providing their own vocational / technical / professional qualifications (Foundation Degrees, CPD qualifications) Universities also try to match their degree programmes to already existing qualifications e.g. Accountancy Degrees ensure a student gains exemptions from specific modules when studying for their professional qualification.

Changes to the UK system

in 2016 the UK government published the first Government 'white paper' on Skills in over a decade which is based on a review published in July 2016 by a panel chaired by Lord Sainsbury which recommended radical changes to the UK's TPE (Technical, Professional Education) sector.

Published by the Department for Education and the Department for Business Innovation and Skills in July 2016 the 'Post-16 Skills Plan' states that the Governments ambition is for young people to receive a solid grounding in the academic subjects and gain academic qualifications until aged 16. At Age 16 each student will have the choice how to proceed with their remaining 2 years of mandatory education - either through an academic route to achieving A-Levels and a University Degree, or to study one of 15 'Technical Options' leading to an industry relevant Technical or Professional Qualification. The qualification standards for the 'Technical Options' will be set by industry - what they need in an employee - and then the awarding bodies must work backwards to design a relevant high quality qualification.

Each 'Technical Option' will group together occupations or Industries where there are shared requirements to form a 'common core' of training in each 'option' and then specific occupations will have specialised modules or training.

The government's intention is for the first of the 'Technical Options' to be ready for delivery by September 2019 with all 15 of the 'options' available by 2022. These reforms (and more) will be phased in and the Technical and Professional Education sector as a whole will be undergoing significant changes for years to come, as such the full impact of these reforms will not be measurable for a decade or more.

A paper on the UK Technical and Profedssional Education can be found in the Recent Report Section, Development Paper at www.marifuture.org. This Development Paper was commissioned by C4FF as a part of their work on the MariePRO project.

The UK educational framework provides a clear example of the modularised approach. The UK has a two-tier system both in secondary and in tertiary education; students at the age of 15/16 can opt for a vocational route viz., National Certificate/Diploma (ONC/ OND) courses or choose an academic route and study for two or more A' Levels, i.e., academic/analytical modules/units of studies. Universities accept school leavers from primarily the academic route with two or more A' Levels but often seriously consider school leavers with good vocational diplomas/qualifications viz., OND but not ONC.

Universities primarily offer degree and higher degree qualifications; some universities together with some further and higher education college/institutes offer vocational diplomas as well as degrees. Some higher education colleges/institutes offer higher degrees and even Masters/MPhil/PhDs. MPhil and PhD Programmes are primarily research based with the requirement for some modules on research methods.

Many universities (ex-polytechnics) for many years offered the BTEC/Edexcel (now known as Pearson) Higher National Diplomas/Certificates (HNDs/HNCs) but in recent years

developed their own local Programmes now known as Foundation Degrees which for all purposes are equivalent to Pearson's BTEC HNDs; BTEC which became Edexcel and now is known as Pearson BTEC, one of the largest awarding bodies in the UK and worldwide (operating in over 100 countries), no longer offers HNDs in the UK university sector, and all their programmes have over the last few years been converted by universities to equivalent Foundation Degrees. Some students with HNDs provided they have performed well are able to enrol on the final year of related degree Programmes and some HND graduates after several years of industrial/commercial experience can often apply for Master (higher) degree programmes. HND/Foundation degrees are set at EQF level 5 and are often of 2 years duration; the degree studies are of minimum 3 years duration. Each year of study is often 120 credits equivalent to 60 ECTS. In addition, programmes, whether two or of three years duration, can be submitted to a professional body such as Institutions of Marine, Science and Technology (IMarEST) for external accreditation; the accreditation would ensure all industry requirements for the profession, set by the Engineering Council, are met and that the programme is also accepted by other professional bodies recognised, for instance, under the Washington Treaty.

The maritime education programmes are no different from other programmes other than that they should also satisfy the IMO STCW requirements including all mandatory safety and other ancillary courses such as fire-fighting, recently required courses such as MRM/ERM, as well as the UK required courses such as Navigation, Arpa, Radar, Ais and EcdiS (NARAS) and Efficient Deck Hand (EDH) which are needed for becoming a deck officer; there is also a requirement to do a level 2 and level 3 NVQ (National Vocational Qualification) or SVQ (Scottish Vocational Qualification) sea diplomas which require the application of the Merchant Navy Training Board (MNTB) sea training portfolio which is a set of units with learning/doing tasks and assignments. The MNTB Sea Portfolios are based on the UK national maritime occupational standards.

The content of a typical Foundation Degree Programme (EQF level 5) in Marine Engineering comprises the first year studies on mathematics, electrics, electronics, engineering management, instrumentation and control, thermodynamics, marine engineering principles and workshop training; the second year includes study on marine plant, marine propulsion steam and motor, engineering design, mechanics, ship stability and construction and engineering resource management and legislation. The studies have a strong emphasis on real-world, problem-based learning, complemented by work-based learning as part of sea training – delivering the engineering knowledge and practical skills to operate safely at sea. On completing their degree (and additional safety training/assessments), the students will be eligible for the STCW III/1 Engineering Officer of the Watch Certificate of Competency, and receive academic exemptions for further certification as STCW III/2 Second Engineer.

The content of a typical curriculum for Deck Foundation Degree Programme (EQF level 5) in Deck Officers in the first year of studies includes navigation, cargo and port operations, meteorology, maritime industry issues and management; the second year includes studies on voyage planning, maritime law and business, command management, ship operations and stability. The academic learning is primarily classroom-based, supported by practical aspects that must be carried out at sea. On competing their foundation degree (and additional safety training/assessments) students will be eligible for the STCW II/1 Officer of the Watch Certificate.

For those looking to boost their maritime career while remaining employed, courses are offered providing the opportunity for an HND or Foundation Degree graduate to top up to a MCA Master Certificate of Competency Unlimited, and to a BSc (Hons) qualification. This will allow the students to build on their existing nautical knowledge and study the principles and applications of operations management in the commercial maritime industry (law, resource management, international trade and safety management). They will develop the formal academic qualifications and skills to take advantage of employment opportunities both at sea and on shore, learn to adapt to the ever-changing requirements of the maritime industry, and develop the problem-solving and organisational skills required of a senior ship's officer or shore-based manager. A typical course, for instance, that is offered by Southampton Solent University (SSU), comprises modules of study on subjects such as maritime and commercial law, maritime issues in the contemporary world, a work-based project, with often three optional topics to focus on, such as safety management, financial management and maritime technical management. The students are expected to study a total of five units (three core units and two options) via blended learning, commencing with a 15-week period of attendance at the academy. They will then complete the course via distance learning over a period of 12 months, supported by their supervisor and course leader.

As well as classroom based BEng programme, it is possible to obtain a degree in Marine operations from SSU's renowned Warsash Maritime Academy (WMA); this programme develops a detailed knowledge of the ship operation on modern merchant vessels which also incorporates the relevant aspects of the maritime industry as whole, both at sea and ashore. The work-based learning approach adopted as part of the sea training element of the programme will prepare the students for a career at sea. The programme places a strong emphasis on real-world concepts and problem-based learning to ensure the students develop both the intended practical skills required for safe ship operations, and knowledge and competence required for a broader understanding of the shipping industry.

The UK universities offer a range of one-year Master degrees and research degrees in a range of maritime subjects, and candidates with good grades can progress from an HND or Foundation Degree onto the final year of an appropriate degree programme and then study for higher degrees inlcuding a PhD provided they have satisfied the entry requirements.

Germany

The German VET system presents an apprenticeship-based, standardised curricula approach, the curricula being standardised in terms of content, but not in terms of time spent (i.e. level of competence reached) on them. The German educational system is deeply rooted on two main pillars: Middle-school (Realschule, Hauptschule) degrees, followed by Initial Education and Training (IVET) and with future career paths within a strong and nation-wide recognised Continuous Education and Training (CVET) system; on the other hand the classical university career with university entrance diploma (Abitur), followed by higher education (HE). Differing from countries like France, where vocational (university of applied sciences) diplomas (baccalauréat professionnelle) are standard for VET-students, in Germany an apprenticeship usually is not combined with a university entrance diploma. But

career paths offered by CVET (Handicraft- or Industrial-Meister, technicians) are in terms of wages, level (EQF level 6 in both cases), and image comparable to bachelor's degrees.

Altogether 344 vocational profiles existed in Germany in 2011: 250 profiles on EQF level 4 / duration 3 years (36 months), 54 profiles on EQF level 4 / duration 42 months, 38 profiles on EQF level 3 / duration 24 months, and 2 profiles (both relicts from national-socialistic era) on EQF level 3 / duration 18 months. The profiles are dual, in fact trial, with different curricula for in-company and school parts (apprenticeship-based VET system). Many companies are specialised, and their work-processes do not cover the whole curriculum so additional training must be provided in a workshop. These workshops are mostly run by companies (large ones) or company-independent; the 3rd learning venue.

On the EQF level 4 (IVET) a 3-year "Schiffsmechanikerbrief" ("Ship mechanic") programme is provided in MET by three VET-schools as part of the dual system, cooperating with ~100 shipping companies, hiring ~200 apprentices each year (with 2/3 of their time in company). Usually vocations in Germany are regulated by Vocational Training Act (BBiG); however the ship mechanic programme is regulated by an extra-law (Sea-Vocational Training Act (See-BAV)) due to the fact that apprentices spend most of their time not on German ground – but See-BAV follows voluntarily the paradigms of BBiG. The programme includes IMO certificates officer in charge of a navigational watch (section A-II/1 of the STCW); and officer in charge of an engineering watch (section A-III/1 of the STCW). This is different from all of the other countries examined, where there are separate programmes for deck (section A-II/1 of the STCW) and engineering (section A-III/1 of the STCW) officers.

The following capabilities, knowledge and skills are the object of the 3-year vocational training "Schiffsmechanikerbrief" programme:

1. Integrative capabilities, knowledge and skills:

a) Principles of social competence, vocational training, labour and tariff law,
b) Structure and organisation of the shipping company and operation of ships,
c) Occupational safety and health protection, first aid measures,
d) Planning and preparation of workflows as well as reviewing and assessing the results of the work,
e) Reading, application and compilation of technical documents,
f) Security duties
g) Communication during shipping operations in the German and the English languages,
h) Environment protection and rational use of energy and materials;

2. Capabilities, knowledge and skills that sharpen the vocational profile:

a) Ship management on deck, watch duty
b) Ship management in the engine room, watch duty,
c) Loading and unloading operations,
d) Safety with regard to fire-fighting and rescue,
e) Ship operation technology, electro-technology, control technology and electronics,
f) Maintenance and repairs,
g) Processing of metals.

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On the EQF levels 5 or 6 (CVET) a "Nautischer Wachoffizier" (Techniker) programme of 1 year duration is provided, and programmes of "Schiffsoffizier", (Staatlich geprüfter Techniker) and CVET Technisches Befähigungszeugnisnach STCW95 für alle Leistungen und ohne Einschränkungen of 2 years duration are also provided; IVET Schiffsmechaniker (or equivalent) is mandatory for all of the three programmes.

The HE programmes provided in MET are Internationaler Studiengang Ship Management B.Sc. at the EQF level 6 / duration 3,5 or 4 years [(mandatory University of app. Science entrance diploma and IVET Schiffsmechaniker (or equivalent qualification, or 6 month experience at sea))]; Schiffsbetriebstechnik B.Sc. at the EQF level 6 / duration 3 or 4 years [(mandatory University of app. Science entrance diploma and IVET Schiffsmechaniker (or equivalent qualification or metalcourse))]; Nautik B.Sc. at the EQF level 6 / duration 3 or 4 years [(mandatory University of app. Science entrance diploma, with IVET Schiffsmechaniker (or equivalent) 3 years, without 4 years[ix])]; and Ship Operation Engineering B.Sc. at the EQF level 6 / duration 3 or 4 years [(mandatory University of app. Science entrance diploma, with IVET Schiffsmechaniker (or equivalent) 3 years, without 4 years)]. HE is based on modules, and the crediting system in use is ECTS. The minimum length of a first university degree (bachelor) is 3 years, in MET usually 4 years due to 2 semesters on board (1 semester accredited when prior experience like a VET degree in ship mechanics is provided).

Malta

The Maltese system of educational framework provides another example of internal flexibility with holistic examinations at the end. The Maltese system is not apprenticeship-based, like the German one, but relies on school-based structures. Education in Malta is offered through three different providers: the state, the church, and the private sector, the latter type of school being perceived to be generally English medium schools. While private school financing is based on a mix of fees and contributions from the Government, all Public schools and Church-run schools are completely free of charge. Compulsory education is sub-divided into a six year primary cycle (5 to 10+ years), a two year middle school cycle (11 to 12 years) and three years of secondary education (13 to 16 years). At the end of formal schooling, students are awarded a Secondary School Certificate and Profile, where all types of formal and non-formal learning that takes place during the secondary years is accredited.

Several pathways are available to all students after completing compulsory schooling leading to academic and vocational routes. Entry to most post-secondary institutions is normally gained on the basis of completed secondary education and passes in Secondary Education Certificate exams (SEC). With the SEC Certificate, students can choose careers following a vocational path at Malta College for Science, Art and Technology or Institute of Tourism Studies. They can also choose to start a university career.

Students can follow academic courses at post-secondary schools (also known as Sixth Forms) in a variety of subjects. On completion of these courses they sit for their Advanced Level Examination and they are awarded their Matriculation Certificate. The Matriculation

Certificate examinations are equivalent to the British Advanced Level (A-Level) examinations.

The third edition of the referencing document for Malta (Malta Qualifications Council, 2012) provides a transparent and structured overview of the knowledge, skills and competences expected to form the basis of all qualifications aligned to the MQF and is referenced to the EQF and the qualifications framework of the European higher education area (EHEA). The national curriculum framework gives ample freedom to education and training providers to establish their curricula. The public institutions already offer courses, which are outcomes-based. This also applies to a number of private providers (Cedefop ReferNet Malta, 2012).

IVET has a traditional and holistic qualification structure based on alignment between learning outcomes and learning processes and the requirement that the student be assessed at the end of a learning process. Successful completion of the course is a prerequisite for the award of the state-recognised certificate. National agencies validate and certify students' acquired learning outcomes.

The different methods of assessment and the lack of an MoU between education and training providers hamper the transfer of learning outcomes. Validation of non-formal and informal learning Legal Notice 295/2012 (Malta, Ministry of Education and Employment, 2012b) sets the regulations for validation of informal and non-formal learning. It provides the regulatory framework for the validation process and for the granting of validation awards classified within the MQF in accordance with the types of awards established within the framework. It describes the rights of the National Commission for Further and Higher Education (NCFHE) to establish sector skills committees and sector skills units, the members of which are to be appointed by the Commission with the approval of the Ministry of Education and Employment. The legal notice provides details on the process of validation and how the sector skills committees can regulate validation (Cedefop ReferNet Malta, 2012).

In Malta there are a number of institutions providing training on STCW short courses but only one institution called Malta College for Science Arts and Technology (MCAST) offering vocational qualifications in seafaring. There are two courses that are not pegged to any level in the Malta Qualification Framework – MQF (which is derived from the European Qualification Framework) and these are the OIC Navigational Watch and the Chief Mate. These courses are interrelated as the OIC Navigational Watch is an entry requirement for the Chief Mate. The certificates awarded as a result of completing these courses are issued by Transport Malta as the National Authority for the maritime sector.

The OIC Navigational Watch course aims at giving the candidate the necessary training as an Officer Cadet to qualify for a Certificate of Competence as an Officer in Charge of a Navigational Watch on a foreign-trading merchant vessel. Training consists of a number of maritime related subjects such as Navigation, Meteorology, Signals, General Ship Knowledge and Stability, Cargo Operations, International Regulations. A high level of physical fitness training and leadership training is required, in which all candidates are expected to participate and to attain a high degree of competence. Officer Cadets are expected to dedicate a lot of time to their studies and are also expected to wear a merchant marine uniform whilst undergoing training both ashore and on board ships. Officer Cadets

attending the course may also be assisted in finding a sponsor for the practical training period at sea during the second phase of training on the course. The course duration is three years.

The Chief Mate course is a continuation in the career of a Deck Officer in the merchant marina leading to the issue of a Certificate of Competence as a Chief Mate. The training provided is at management level and candidates attending this course are expected to dedicate a lot of time to their studies and are also expected to wear a merchant marine uniform whilst undergoing training ashore. The course duration is one year.
Apart from the two courses described above, MCAST offers a qualification of Probationary Officer Cadet as preparatory for the OIC Navigational Watch at level 3; a qualification of MCAST Advanced Diploma in Marine Engineering at level 4: This course is the first step for those who wish to embark in a career in the maritime sector, with opportunities being available both locally and internationally. The course introduces the basics of engineering related to marine vessels and is ideal for those who wish to be introduced into this sector and obtain a formal vocational qualification. After the successful completion of the course, you will become a technical person with sound theoretical and practical competences. The course is a combination of modular training and work placement; and results in a qualification of Bachelor of Science (Honours) in Marine Engineering at level 6. The qualification of Bachelor of Science (Honours) in Marine Engineering deals with the design, construction, operation and maintenance of engines and machinery in ships and marine installations. At this level of study a candidate is expected to develop the qualities needed for employment in situations requiring the exercise of personal responsibility, technical leadership and commercial management in complex and unpredictable circumstances as expected in the Maritime Industry. In all cases MCAST is the awarding body of the qualification.

The peculiarity in the Maltese maritime education and training system is that the curricula of VET training programmes in maritime qualifications are purely linked to the STCW requirements with no permeability with other elements. Thus, VET falls outside the scope of the STCW courses. This is because the National Commission for Further and Higher Education as the responsible authority stands by a strict interpretation of the directive 2012/35/EU where it is stated that "Furthermore, the provisions for recognition of professional qualifications under Directive 2005/36/EC of the European Parliament and of the Council of 7 September 2005 on the recognition of professional qualifications (5) are not applicable with regard to the recognition of certificates of seafarers under Directive 2008/106/EC". The interpretation of the authority is that there is no relevance in bridging the two systems because what is STCW is applicable in full to the maritime sector while EQF and ECVET are not. However, one should also take into account not only directive 2012/35 but also other pieces of legislation emanating from the Educational sector (Bruges Communiquè; Copenhagen Communiquè etc) that have a relevance for all sectors, incuding maritime. Even though the STCW system is clear and efficient when it comes to working onboard a ship, there are huge issues arising when a worker wants to pass to a shore based profession (where none of the qualifications acquired are recognised). This is a fact that pushes the local MET actors to pave the way for recognition of MET programmes in the MQF/EQF.

Finland

The Finnish VET system comprises elements of standardised curricula and modularised approaches. Students at the age of 16 may choose to continue their secondary education in either an academic track (lukio) or a vocational track (ammattikoulu), both of which usually take three years and give a qualification to continue to tertiary education in a university or university of applied sciences. Formerly, only university graduates could obtain higher (postgraduate) degrees, however, since the implementation of the Bologna process, all bachelor's degree holders can now qualify for further academic studies.

Upper secondary vocational education (EQF level 4) and training is provided in vocational schools and in the form of apprenticeship training; in addition, a vocational qualification can be obtained through a so-called competence test administered by a qualification committee. [x]At national level, The Ministry of Education and Culture sets the general goals for vocational education and training, determines the structure of qualifications, and the core subjects. Furthermore, the Finnish National Board of Education decides the national requirements of qualifications, detailing the goals and core contents of each vocational qualification. The curricula are compliant with the National Qualification framework (NQF) and the European Qualification Framework (EQF). At local level, the education providers draw up their own curricula based on the core curricula provided by the National Board of Education. While the training providers are free to target their training provision as they choose, to meet the needs of business and industry, the curricula can be regarded as standardised with respect to both, content and time spent; the goals and core contents of each vocational qualification are detailed in the core curriculum in question, and the length of studies per each vocational qualification is set as 120 ECVET credits. Besides the sector-spesific topics, 35 credits of common vocational modules are embedded in each of the qualifications. These modules comprise compulsory subjects, e.g., languages and mathematics, and optional subjects such as social and cultural competences. There are no holistic examinations at the end of vocational studies. The training programmes are structured as units, and the units are assessed separately.

Training Programmes of universities of applied sciences (EQF level 6) are authenticated by the Ministry of Education and Culture; the Ministry setting the names, titles and scopes of qualifications, whereas each of the universities of applied sciences are responsible for the content and curricula of their training programmes.

In Finland, the following EQF level 4 vocational upper secondary qualifications are provided by vocational schools in MET (180 ECVET credits each; duration 3 years, 3½ in practice for Deck Officers): Study Programme for Engineer Officers, Watchkeeping Engineer Officer; Study Programme for Deck Officers, Deck Officer; Study Programme in Deck and Engine Repairing, Repairer; Study Programme in Electrical Operation, Ship's Electrician. The following two EQF level 6 training programmes (270 ECTS credits each; duration 4 years) are provided by universities of applied sciences: Bachelor of Marine Technology and Bachelor of Engineering, Maritime Technology. Completion of an approved education and training programme, combined with the required sea-service, results into the Finnish Transport Safety Agency issuing a license concerned (operational level CoCs on the EQF level 4 and management level CoCs on the EQF level 6).

The requirements for vocational qualification in seafaring for Deck Officers at the operational level (national core curriculum), set by the Finnish National Board of Education, comprise 100 ECVET points of obligatory modules: Navigation, Marine transport engineering, Seamanship and Management, and Radiocommunications; minimum 10 ECVET credits of optional modules (incl. Officer of the Watch duties, 10 ECVET credits, as obligatory); and 35 ECVET credits of common vocational modules such as languages, mathematics, health education, cultural knowledge, entrepreneurship, and environmental studies.

A typical Bachelor of Marine Technology training programme includes basic studies such as mathematics and natural sciences, language and communication studies, basics of business administration, and maritime law; professional studies, including Seamanship and Ship Machinery Engineering, Navigation and Cargo Transportation, Radio Operations and Maintenance, Bridge Operations, and Cargo Operations; and optional studies such as CTTP Advanced Chemical Tanker Training Programme (STCW A-v/1, 15-21), OTTP Advanced Oil Tanker Training Programme (STCW A-V/1, 8-14), and Project Management Skills; together with practical training and a bachelor's thesis.

Compatibility with ECVET; modules, credits & teaching, learning and assessment

Examining the compatibility with ECVET and the state of ECVET developments within different national VET systems involves questions on unitisation/modularisation, transfer and accumulation; whether units and/or modules are in use, whether a national credit transfer system for VET is used, and what are assessments based on.

There is currently widespread use of units/modules within IVET in Europe ([xi]„Monitoring ECVET implementation strategies in Europe in 2013"). This is the case in two out of the five MariePRO countries examined, Finland and the UK, which both have credit transfer systems for VET and credit points attached to the existing units/modules; the units/modules are individually certified and may be accumulated towards a full qualification. Whereas, the VET systems in Italy and Malta (with predominantly school-based IVET) do not make use of units and/or modules and do not have credit transfer systems in place for VET, though both are gradually introducing units or modules. The German apprenticeship-based VET system does not make use of units or modules.

Furthermore, in Finland and the UK, the learning-outcome based approach has been implemented for several years in VET; the vocational qualifications have been structured from modules, and recognition of prior learning (for both formal and informal learning) is recognised and validated by law. The UK system for some time had a similar credit system to ECVET and there are those who of the view that the EU ECVET is based on the UK vocational education system. In the UK it is a normal practice for two institutions (national or worldwide) to prepare a memorandum of understanding (MoU) and agree on exchanging students/cadets. The practice requires the two institutions to review one another programmes and ensure the students are not disadvantaged and progression routes are feasible and fair.

In Finland, the measures taken towards implementing ECVET have been linked with the national reform of vocational upper secondary qualifications. The national core curriculum and the updates accordingly on the local level, took effect in the autumn 2015 as part of national vocational upper secondary education reform. The reform also involved replacing of the former study weeks with ECVET compliant credits (180 credits per vocational qualification). The latest alignments by the Finnish government with regard to VET are putting more emphasis on the learning outcome based approach and cooperation between school and industry; learning processes in work places are being promoted by creating a new training agreement model and decreasing the economic and administrative burden for the employer from apprenticeship training.

In Italy, competence-based education has been introduced by a recent reform at EQF levels 4 and 5, but the Italian VET system is still lacking a credit system. MET poorly meets the requirements of ECVET with not much experience of ECVET at EQF levels 4 and 5; at ITS level there can be seen more possibilities for ECVET, at least in the first phase of the next probable application of a credit system.

In Germany, ECVET (or something comparable) is not in use. Compatibility of ECVET (points, assessment of single units) with German VET-laws and beliefs is not given. The German VET system is not based on creditable units. Programmes are seen as holistic vocational qualifications; LO‘s are not assessed separately but in mid-term examinations and at the end of programme. The only aspect within German VET-law that could be interpreted as a form of crediting is the opportunity for good apprentices (good grades both in school and in the company) to shorten the programme by 6 months. But in MET even this is not possible due to minimum time requirements onboard. VET providers have no experience with ECVET or comparable approaches, and they are not very convinced about the toolbox; assessing single units or introducing a fixed amount of points for a unit are not seen as a step forward. The language of lessons is mainly German, partly English; at the end of their programme apprentices should have reached Level B1 (independent) in English on the European competence scale xiiCEFR.

There is no systemic approach to the validation of non-formal and informal learning (no common framework or standardised procedures) in the German VET system, so validation varies with certification bodies and sectors. There are several options for individuals to have their qualifications officially recognised, but those options are limited and always require examination of a person´s qualification(s) by an authorised organisation. (Monitoring ECVET implementation strategies in Europe in 2013)

In HE, ECTS (1 year = 60 credits) is used in all the partner countries with successes in terms of student mobility. In Germany, for example, experiences with foreign students (or German students in partner universities (Cadiz, Izmir)) are very positive; exchanges are based on long-lasting networks and mutual trust. A “mobility window” within the 4th semester was established; including a common syllabus (incl. STCW) with partner universities. Language of instruction at Bremen University of applied sciences is English. In MET practical semesters onboard are accredited with ECTS.

Assessment

Assessment in the UK vocational education system is based on pass/fail but many colleges and universities for some modules allow other grades such as merit and distinction. There are also a system of % marking provided by some colleges and universities. Pass is around 40 to 50 % while merit is often for a performance above 65 % and distinction is for a performance above either 80 or 85 %.

The Finnish assessment system in vocational upper secondary qualifications is based on vocational skills demonstration; courses as pass/fail, except for the modules to supplement vocational skills (general subjects to all vocational upper secondary qualifications), which are graded from 1 to 3. Assessment of study units in universities of applied sciences is based on learning objectives defined for the unit concerned; pass/fail or assessment scale from 1 to 5.

The Italian assessment system for the ITTLs is based on a final exam prepared at a central level (by the Ministry of Education) that is graded from 60 to 100 (under 60 the exam is considered not passed), taking into account the results in every particular subject from the previous three years. The ITSs cycle ends with a final exam, too, graded from 6 to 10 (under 6 is considered not passed), but is prepared at a local level. Both exams are competence-based (not only closed theoretical questions but problem solving approach too).

In Malta the assessment of the competences achieved is done in different ways depending on the study paths. In the advanced diploma in marine engineering at the EQF level 4, the assessment varies and is dependent on Study Unit, including a mandatory final project, while for the OIC Navigational Watch course, the students are assessed for theory and practice including an oral exam at the end of first and second semester. These assessments are part of the requirements of the STCW quality standards. Where conducting of assessments involves the use of simulators the students are examined in the practical experience of the simulator to the satisfaction of the examiner. In the Chief Mate course students are assessed for theory and practice including oral exams at the end of the course. These assessments are part of the requirements of the STCW quality standards. Where conducting of assessments involves the use of simulators the students are examined in the practical experience of the simulator to the satisfaction of the examiner. In the probationary officer cadet course, the students are assessed for theory and practice at the end of first and second semester. These assessments are part of the requirements of the STCW quality standards. Where conducting of assessments involves the use of simulators the students are examined in the practical experience of the simulator to the satisfaction of the examiner.

Assessment in the German apprenticeship system is not based on units/modules awarded separately, but on final examinations as follows:

- (1) The final examination consists of Parts 1 (after 1,5 years) and 2 (after 3 years) that are taken at different times and are free of charge for apprentices. The aim of the final examination is to establish whether the candidate has acquired professional competence. In the final examination the candidate shall be required to prove that he has mastery of the necessary vocational capabilities, possesses the essential knowledge and skills and is familiar with the subject matter being taught. The final examination may be retaken twice.

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- (2) The final examination is deemed to have been passed if, with regard to the manufacturing of the examination pieces and execution of the work samples (practical examination) and the written examination, a grade of “adequate” at least shall have been achieved in each one.
- (3) For the purpose of determining the overall result of the practical examination and the written examination, Part 1 of the final examinations shall be weighted at 35 per cent and Part 2 at 65 per cent.
- (4) After the final examinations have been passed the candidates are to be issued with a final certificate according to the pattern designated by the responsible body.

At universities in Germany it is up to the lecturer how he assesses the learning outcomes; usually written examinations or interviews are chosen and rated with a grade between 1 (very good) and 5 (failed). For module “ship command IV”, which includes the relevant STCW chapters, a new assessment scheme was developed: students work in small groups on typical STCW-relevant tasks in a simulator; with the focus of the assessment being the ability to apply knowledge and skills in different roles; no grades are in use: the student may only pass or fail.

Process of certification to become an officer

To be able to work as an officer onboard a candidate needs to complete on-the-job-experience at sea in order to fulfil the minimum mandatory sea-time embedded in the study path. Also, in order to become a licenced mariner, a candidate needs to obtain an STCW compliant license and a Certificate of Competency (CoC). Each country (administration) is tasked by the IMO to incorporate a statement of compliance with the STCW Code into their Certificate of Competency (license). Most countries do not have any CoCs that are exempt from the STCW and therefore have incorporated their statement of compliance right on the face of the CoC.

There are differences in the processes and responsibilities in issuing of Certificates of Competency between countries. In two out of the five countries examined, Germany and Finland, no further examinations are required after achieving a qualification and completing a required sea service. In Germany, the bachelor’s degree includes STCW license at operational level; and after additional 2 years onboard, the competent body issues a management level license (ships’ master) without additional examination. In Finland, CoCs are issued by the Finnish Transport Safety Agency without additional examination, the candidate having completed an approved education and training programme, combined with the required sea-service.

In Italy, Malta and the UK, the process of becoming an officer involves extra exams and/or other requirements being met. In Italy, the certification for both, operational and management level, is provided by the Coast Guard with extra exams in respect to those ending the ITTLs or ITSs study path (qualification separately managed by the Ministry of Transport). On the contrary to what happens in most of Europe, in Italy management level certification is not provided within the university system: a bachelor’s degree in the Parthenope University only opens up the door to start a career at sea as a cadet. Recently,

the Ministry of Transport has made mandatory a course of 300 hours (deck department) or 570 hours (engine department) to have access to the management level (1st Officer), for which until 2014 only an exam was required. These kinds of courses are carried out by approved institutions, such as ITSs and some ITTLs. However, there is no recognition for an EQF level, since these courses are managed out of the Ministry of Education action arm.

In Malta, the courses to become an Officer of the Watch (OOW) or Chief Mate (CM) are available at MCAST Malta, and the awarding body is Transport Malta as the national authority for the maritime sector. For the OOW and CM qualifications under the STCW in Malta, part of the exams are carried out internally at MCAST. In this case, the assessors are Maltese and the assessment is based on papers and documentation produced in Malta. However, part of the curriculum for these STCW qualifications is assessed by the Maritime Coastal Agency (MCA) UK, particularly key subjects such as stability, navigation and chart work. These examinations, consisting of both oral and written tests, have been kept in place by Malta even after independence, and every year a team of assessors from MCA visits the island to carry out this task.

In the UK, not only extra exam(s) but also extra courses need to be passed, and a Notice of Eligibility (NoE) obtained in order to become an officer and achieve a CoC. Colleges' higher education provisions and universities are the responsibility of the Higher Education Funding Council (HEFC) for England or for Scotland. The responsibility is for academic programmes only. The responsibility for the Certificate of Competency and the ship's officer certificate (OOW) is given to the UK's Maritime Coastguard Agency (MCA). The agency requires all HND/Foundation Degree and Degree students sit for an oral examination, and may require some to sit its two written examinations. Before the MCA oral examination can be taken, all candidates must obtain the Notice of Eligibility (NoE) from the Agency which can only be obtained if all compulsory, STCW required safety/ancillary courses are successfully taken. In addition to the IMO compulsory courses, MCA requires successful completion of several other courses such as Efficient Deck Hand (EDH) and Navigation, Arpa, Radar, Ais and EcdiS (NARAS), which are needed for becoming a Deck Officer, for instance.

Onboard training (general practices, incl., e.g., who issues and who assesses the certificate?)

An STCW approved period of seagoing service is to be included in the study path of candidates to become officers (minimum 12 months at the operational level for deck and minimum 6 months for engineer officers). To provide evidence of structured onboard training, the sea-service is to be documented in an approved training record book. The following presents an overview of the onboard training practices in each of the countries examined, including responsibilities at the institutional and national level, assessment and validation.

There are differences in the practices of documentation and/or assessment among countries. Finland, Malta and Italy use an STCW compliant On Board Training Record Book/Discharge Book/Cadet Training Booklet which is required to be signed by the training officer/supervisor onboard. In Italy, the process involves an additional validation of the assessment at the MET institution. Whereas, in the UK, students are expected to register on

a particular sea diploma (NVQ or SVQ) which incorporate the completion of the Merchant Navy Training Board (MNTB) sea training portfolio; the latter under the supervision of a designated training officer on board. The portfolio is then externally assessed by a qualified assessor. In Germany, the training periods onboard, apart from following the standard STCW approved procedures, are managed resp. supervised by a designated national body, and a set of criteria regarding the training periods regulated by national legislation.

In Finland, the student on-board follows the orders given and fills in the STCW compliant On Board Training Record Book, which is signed by the supervisor in charge of the training period. The students are prepared for onboard training periods with guidance on what kind of practice is needed, and the supervisor is informed on the level of knowledge of the student. The on-board training assessment is based on the days spent onboard, which is not what the national structure of qualifications calls for. Concern has been raised on the fact that teachers should be better able to monitor and supervise students onboard. Navigation skills are evaluated by vocational skills demonstration with a simulator, where the on-board supervisor is not involved.

In Italy, the ITSs provide short on-board experiences (stages) before students get their diploma, so they represent an important moment of training but they are not counted to be summed up into the IMO 12-months. On-board training is managed at ITS level with scheduled embarks on the same company for every student, ground based tutoring, reports from Officers on-board and specific cadet training booklet; ITSs validate the assessment made by the tutor Officer onboard.

In Malta, onboard training processes follow the STCW requirements. Sea-time is not assessed but it is certified by the ship‘s master and recorded in an individual book named discharge book. The discharge book bears the relevant information about the sea-time of the person such as days spent on board and conduit. The discharge book can be substantiated by certificates such as the discharge certificate and/or the watch keeping certificate that are both issued and signed by the Ship Master.

In the UK, there is a requirement to do a level 2 and level 3 NVQ (National Vocational Qualification) or SVQ (Scottish Vocational Qualification) sea diploma which includes using a Merchant Navy Training Board (MNTB) sea training portfolio which is a set of units with learning/doing tasks and assignments. The MNTB Sea Portfolios are based on the UK national occupational standards. There are currently two portfolios for ship‘s officers, one for deck and one for engineers. The MNTB is known to be by far more demanding than other available sea training/record books such as ISF (International Shipping Federation). All the required onboard activities have to be signed by the training officer on board and later assessed by a qualified assessor (university or a qualified external assessor). The students are prepared for onboard training periods with guidance on what kind of practice is needed, and the training officer and later the assessor are informed on the level of knowledge, skills and competence of the student.

In Germany, onboard training is managed resp. supervised by “Berufsbildungsstelle Seeschifffahrt e. V. (Responsible Body for Maritime Vocational Training), which monitors vocational training including the part that takes place outside training locations, and supports the vocational institutions by way of advising apprentices. A set of criteria regarding the

training periods, including criteria for a ship to be recognised as a training location and criteria for ship's officers and ship's mechanics to be appointed as instructors, is been regulated by national legislation. The assessment of onboard training periods follows the principles of the apprenticeship-based VET system where units/modules are not awarded separately; the professional knowledge, skills and competences acquired during the study path, onboard training periods included, are assessed in the final examinations. In addition, those providing training are to issue apprentices with a testimony to training onboard at the end of each period of service onboard. This should contain details of the nature and duration of the vocational training and the capabilities, knowledge and skills acquired by the apprentices.

STCW; Protection of the marine environment in the curriculum

Protection of the marine environment is included in the STCW as one of the competence areas for each rank and function of seafarer (Deck and Engine Support level: 'Apply precautions and contribute to the prevention of pollution of the marine environment'; Deck and Engine Operational level: 'Ensure compliance with pollution-prevention requirements' & 'Monitor compliance with legislative requirements'; Deck Management level: 'Plan and ensure safe loading, stowage, securing, care during the voyage and unloading of cargoes' & 'Monitor and control compliance with legislative requirements and measures to ensure safety of life at sea, security and the protection of the marine environment'; Engine Management level: 'Monitor and control compliance with legislative requirements and measures to ensure safety of life at sea, security and the protection of the marine environment'). Thus, protection of the marine environment forms an integral part of MET studies, and the competences regarding each rank and function of seafarer are taught as part of MET curricula in deck and engineering programmes with each of the [xiii]'White List' countries having demonstrated a plan of full compliance with the STCW as amended. Further, the IMO course 1.38 Marine Environmental Awareness if provided as guidence for STCW compliant training on marine environmental issues. Regardless of the transnational recommendations and minimum content requirements, there are differences in the structure, duration and forms of studies between the countries and institutes.

Finland

In operational level deck and engineering programmes in Finland ([xiv]EQF level 4), marine environmental awareness is embedded in compulsory studies. It is taught as part of "Seamanship and Maritime Management" and "International conventions" modules. In addition, individual institutes provide their own optional courses, e.g., "Eco training" focusing on ecologically optimizing the steering of a ship. In the core curriculum of maritime vocational upper secondary qualifications (having entered into force in autumn 2015) there are altogether 35 ECVET credits of common vocational modules. These modules comprise compulsory subjects, e.g., languages and mathematics, and optional subjects, including environmental awareness as part of social and cultural competences. Environmental awareness within these optional subjects covers both, environmental awareness on a general level and with regard to the professional qualification concerned. In addition to the above mentioned "Seamanship and Maritime Management" and "International conventions"

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modules, environmental awareness topics within the optional subjects cover approximately 1 ECVET credit. In the operational level studies in Finland, the STCW requirements are being followed as well as the IMO Model course 1.38, although the extent of hours recommended in the Model course cannot be reached because of the requirements in the national framework. The universities of applied sciences ([xv]EQF level 6) are more flexible with regard to the content and curricula of their management level deck and engineering programmes, and are not facing the same challenges as the vocational upper secondary institutes with their limited time frames in meeting the requirements of the STCW.

Italy

Italy is facing somewhat similar challenges in ITTL (EQF level 3 & 4) deck and engineering programmes as Finland. ITTLs offer a study path that complies with a major percentage (about 75 %) of the STCW requirements in terms of topics and number of hours. ITTLs don't strictly follow the IMO Model courses and don't reach the total teaching hours recommended, but the curricula are built on the basis of the National guidelines and the STCW Tables. Whereas, the ITSs and the Maritime University (EQF levels 5 & 6) go beyond the STCW, and the Ministry of Education gives them more freedom to set their Programmes than ITTLs. All institutes offer courses with the STCW embedded into general study path, thus it is very difficult to separate the STCW topics from the general scheme for ITTLs, where the training starts at the age of 15 - 16 years, and general education is still needed.

In the ITTLs Marine environmental awareness is embedded into the study path in both, deck and engineering Programmes thogh only about 10 hours are dedicated to it. At ITS level a specific course is provided (MARPOL/ENVIRONMENTAL - 20 hours).

The UK

In the UK, all MET Programmes, namely, HNDs, Foundation Degrees and Degree programmes incorporate the following requirements: IMO Model course 7.04 - Officer in charge of an engineering watch at the operational level and IMO Model course 7.03 - Officer in charge of a navigational watch at the operational level. All degree programmes also satisfy the requirements of the following: IMO Model course 7.01 - Masters and Chief Mates at the management level and IMO 7.02 Model course - Chief Engineer Officer and Second Engineer Officer at the management level. The following EQF level 6 degree programmes are provided by several universities: Bachelor of Nautical Science or Navigation (360/240 credits/ECTS) - operational/management and Bachelor of Marine Engineering (360/240 credits/ECTS) - operational/management.

The arrangements for the protection of the marine environment / marine environmental awareness are similar to other countries such as Finland. The requirements are embedded in compulsory studies in both, deck and engineering programmes. The requirements are also transformed into a 2-day course for seafarers already working in industry and a 5-day course for cadets who did not do part, or all, of the compulsory requirements due to being at sea training.

Germany

In Germany, marine environmental awareness courses are integrated part of the VET curriculum, STCW standards are largely exceeded. STCW-certificates of “rating deck” and “rating engines” are issued together with the journeyman’s certificate, with the certificate “watchkeeping” issued after the first part of final examination (after 18 month). Marine environmental awareness has its own part in the curriculum.

Malta

In Malta, the protection of the marine environment / marine environmental awareness is incorporated in the curriculum, particularly in that for Chief Mate at management level, MARPOL is applied thoroughly. The environmental issues are dealt with especially in the ship management courses and deal with sewage management, garbage management, oil pollution and air pollution. At lower levels, such as Officer of the Watch, the environmental issues are not explained from a theoretical point of view, but cadets will have hands-on experience on such matters during their sea-time and at operational level.

Harmonization of Maritime Education and Training (MET)

Based on the MariePRO findings, harmonization of MET is most commonly seen as a desired goal. This is the prevailing view of the MET actors interviewed in Finland, Italy, Malta and the UK. The Finnish MET actors see that uniform qualification requirements would be desired, even though in practice, however, it is seen as a challenge. This is due to the different structures, traditions and practices of national educational / VET systems, differing approaches in teaching and learning, differing curriculum contents - and differing accumulation and assessment systems, as introduced in the first chapters in this report. Furthermore, the countries examined here only provide a modest extract of the countries and systems within the EU as a whole. Particular pressure is experienced by the Finnish MET actors due to the strict requirements of the national VET system, emphasizing the aims of “educating proper citizens”, and dedicating 35 credits of total 180 per each vocational qualification (EQF level 4) for general subjects such as mathematics, languages etc. In MET it results into a difficult situation where part of the required supervised on-board training cannot be included in the standard three years of studies, but the period of studies is extended in practice. Recently (autumn 2016), however, a process has been started by the national authorities to revise the qualification requirements of the vocational qualifications in seafaring to fit in the IMO STCW required onboard training (12 months in deck programmes; to be revised in engineering programmes). In Malta and the UK, the MET actors are strongly supporting further harmonisation of MET. However, the MET actors are not concerned on the national level, since in Malta MET training is purely linked to the STCW requirements, and the UK system has practically harmonised MET at vocational and degree level (based on the IMO STCW requirements).

Contrary to the other countries examined, In Germany there is no interest in a uniformed curriculum in MET on a European level: Stakeholders from German VET provider are very

convinced of the way STCW is integrated in German curriculum and the unique share of responsibilities between shipping companies, VET schools and the responsible body for Maritime Vocational Training. German VET providers feel that it is not very realistic that other European countries would implement an apprenticeship scheme in MET and any other kind of harmonisation would lead to a lowering of German standards or a restructuring of responsibilities. So there is no interest in a uniformed curriculum in Maritime Education and Training on a European level.

	FINLAND	GERMANY	ITALY	MALTA	UK
National framework of education	• Students at the age of 16 may choose to continue their secondary education in either an academic track (lukio) or a vocational track (ammattikoulu), both of which usually take three years and give a qualification to continue to tertiary education in a university or university of applied sciences. Formerly, only university graduates could obtain higher (postgraduate) degrees, however, since the implementation of the Bologna process, all bachelor's degree holders can now qualify for further academic studies. • Upper secondary vocational education (EQF level 4) and training provided in vocational schools and in the form of apprenticeship training; in addition, a vocational qualification possible to	• German educational system deeply rooted on two main pillars: Middle-school (Realschule, Hauptschule) degrees, followed by Initial Education and Training (IVET) and with future career paths within a strong and nation-wide recognised Continuous Education and Training (CVET) system; on the other hand the classical university career with university entrance diploma (Abitur), followed by higher education (HE). - Differing from countries like France, where vocational (university of applied sciences) diplomas (baccalauréat professionnelle) are standard for VET-students, in Germany an apprenticeship usually is not combined with a university entrance diploma. But career paths offered by CVET (Handicraft- or Industrial-Meister,	• Secondary school system made up of a 5 years cycle (14 - 19 years), vocational education starting in the early stages of the system, but the topics about the specific field chosen dealt with only when students are 16 years, because the first 2 years of the secondary school are very general. • Vocational training divided into professional training (providing practical competences in mainly handicraft-related fields) and technical training (providing practical competences but also deeper theoretical knowledge in economic and technological fields) • Secondary school ending with a national exam, after which students get a diploma at the EQF level 4 and have options to start working without any additional training; continue their vocational training in ITS (Istituti Tecnici Superiori), after	• Education in Malta is offered through three different providers: the state, the church, and the private sector, the latter type of school being perceived to be generally English medium schools. While private school financing is based on a mix of fees and contributions from the Government, all Public schools and Church-run schools are completely free of charge. • Compulsory education is sub-divided into a six year primary cycle (5 to 10+ years), a two year middle school cycle (11 to 12 years) and three years of secondary education (13 to 16 years). At the end of formal schooling, students are awarded a Secondary School Certificate and Profile, where all types of formal and non-formal learning that takes place during the secondary years is accredited. • Several pathways are	• Two-tier secondary and tertiary education systems; students at the age of 14/15 can opt for the acsdemic route viz., General Certificate of Secondary Education - GCSE) or a variety vocaional qualifications in a broad range of topics offered by several awarding bodies such as City and Guilds, Edexcel, OCR, NCFE and ABC Awards (the United Kingdom awarding bodies) such as Key Skills Awards, Certificates and Diplomas - These routes continue into post 16 education viz., Choose an academic route and study for 2 or more A' Levels, i.e., academic/analytical modules/units of studies and then attend University - The National Apprenticeship Service helps people 16 or more years of age enter apprenticeships in order to learn a skilled trade and gain a qualification such as a Dipolma or Degree (vocational or Academic). from a college.

	be obtained through a so-called competence test administered by a qualification committee. • Training Programmes of universities of applied sciences (EQF level 6) authenticated by The Ministry of Education and Culture; the Ministry setting the names, titles and scopes of qualifications, whereas each of the universities of applied sciences responsible for the content and curricula of their training programmes.	technicians) are in terms of wages, (EQF level 6 in both cases), and image on the same level as Bachelor degrees. • Altogether 344 vocational profiles in 2011: - 250 profiles on EQF level 4 / duration 3 years (36 months), - 54 profiles on EQF level 4 / duration 42 months, - 38 profiles on EQF level 3 / duration 24 months - 2 profiles (both relicts from national-socialistic era) on EQF level 3 / duration 18 months. - Profiles are dual, in fact trial, with different curricula for in-company and school parts (apprenticeship-based VET system). Many companies are specialised; their work-processes do not cover the whole curriculum so additional training must be provided in a	two years with on-the-job training resulting into a qualification at the EQF level 5; or start a university course to reach the EQF level 6 (3 years) or EQF level 7 (5 years).	available to all students, after completing compulsory schooling, leading to academic and to vocational routes. Entry to most post-secondary institutions is normally gained on the basis of completed secondary education and passes in Secondary Education Certificate exams (SEC) • With the SEC Certificate, students can choose careers following a vocational path at Malta College for Science, Art and Technology or Institute of Tourism Studies. They can also choose to start a university career. • Students can follow academic courses at post-secondary schools (also known as Sixth Forms) in a variety of subjects. On completion of these courses they sit for their Advanced Level Examination and are awarded their Matriculation Certificate.	• Universities primarily offer degree and higher degree qualifications; some universities together with some further and higher education college/institutes offer vocational diplomas as well as degrees. • Some higher education colleges/institutes offer higher degrees and even Masters/MPhils/PhDs. • Many universities (ex-polytechnics) for many years offered the BTEC/Edexcel (now known as Pearson) Higher National Diplomas/Certificates (HNDs/HNCs) but in recent years developed their own local Programmes now known as Foundation Degrees which have a vocational focus. • Foundation degrees are set at EQF level 5 and are often of 2-year duration; the degree studies are of 3 years duration. • Each year of study is often 120 Credits equivalent to 60 ECTS.

		workshop. These workshops are mostly run by companies (large ones) or company-independent; the 3rd learning venue.
		
		• HE based on modules and using ECTS
		  • Minimum length of a first university degree (Bachelor) is 3 years, in MET usually 4 years due to 2 semesters on board (1 semester accredited when prior experience like a VET degree in ship mechanics is provided).
		  • Short Cycle Higher Education (SCHE) certificates like foundation degrees do not exist (differing from the UK).
					• In addition, programmes, whether 2 or of 3 years duration can be submitted to a professional body such as Institutions of Marine, Science and Technology (IMarEST) for external accreditation; the accreditation would ensure all industry requirements for the profession, are met and that the programme is also accepted by other professional bodies recognised under the Washington Treaty.

Maritime institutes and training programmes	• Altogether three EQF level 4 maritime institutes in the Mainland Finland, offering the following four (some only two)	• IVET, "Schiffsmechanikerbrief" ("Ship mechanic"), EQF level 4, duration 3 years • The three institutions	• MET provided since the third year of the secondary school in 53 ITTLs (Istituti Tecnici dei Trasporti e Logistica) as part of technical area of VET at	• A number of institutions providing training on STCW short courses but only one institution, Malta College for Science Arts and Technology (MCAST)	• MET Programmes no different from other programmes other than that they should also satisfy the IMO STCW requirements together with the UK required courses such as

	vocational upper secondary qualifications: • Vocational Qualifications in Seafaring, 180 ECVET credits: • Study Programme for Engineer Officers, Watchkeeping Engineer Officer • Study Programme for Deck Officers, Deck Officer • Study Programme in Deck and Engine Repairing, Repairer • Study Programme in Electrical Operation, Ship's Electrician • Altogether three universities of applied sciences in the Mainland Finland, offering the following two EQF level 6 training programmes: • Bachelor of Marine Technology, 270 ECTS credits • Bachelor of Engineering, Maritime Technology, 270 EC TS credits	providing the programme are part of the dual system, cooperating with ~100 shipping companies, hiring ~200 apprentices each year (2/3 of time in company) - Usually vocations in Germany are regulated by Vocational Training Act (BBiG); ship mechanic is regulated by an extra-law (Sea-Vocational Training Act (See-BAV)) due to the fact that apprentices spend most of their time not on German ground – but See-BAV follows voluntarily the paradigms of BBiG. - Programme includes IMO certificates officer in charge of a navigational watch (section A-II/1 of the STCW); and officer in charge of an engineering watch (section A-III/1 of the STCW). • CVET, "Nautischer Wachoffizier" (Techniker), EQF level 5 or 6, duration 1 year • IVET Schiffsmechaniker (or equivalent) mandatory	EQF level 4, two ITSs (Istituti Tecnici Superiori) at EQF level 5 and one maritime university at EQF level 6 (Bachelor degree) - Courses on Navigation, Machinery/Engineer, Shipbuilding, Electronics, Logistics, Maritime Law, Math, Maritime English with different lessons time depending on the deck/engineering Programmes - Management level training provided by the same institutes (not all of them), but it is not recognised as EQF 6 level (Maritime University in Naples doesn't give access to the management level certification; the Bachelor degree is useful only to start the career at sea as cadet). • Students having completed successfully ITTLs can start working on board as cadets, or can try to enter one of the existing two ITSs (Istituti Tecnici Superiori) providing MET at EQF level 5 (access under severe selection); ITSs offer a 2-years long study path that alternates ground based lessons and	offering Vocational Qualifications in Seafaring: There are two courses that are not pegged to any level in the Malta Qualification Framework – MQF (derived from the EQF): the OIC Navigational Watch and the Chief Mate. The courses are interrelated as the OIC Navigational Watch is an entry requirement for the Chief Mate. The certificates awarded are issued by Transport Malta as the National Authority for the maritime sector. • OIC Navigational Watch (3 years) - Aims at giving the candidate the necessary training as an Officer Cadet to qualify for a [xvi]CoC as an Officer in Charge of a Navigational Watch on a foreign-trading merchant vessel - Training consists of a number of maritime related subjects such as Navigation, Meteorology, Signals, General Ship Knowledge and Stability, Cargo	Navigation, Arpa, Radar and Ais and EcdiS (NARAS) and Efficient Deck Hand (EDH) which are needed for becoming a Deck Officer for instance; there is also a requirement to do a level 2 and level 3 NVQ (National Vocational Qualification) or SVQ (Scottish Vocational Qualification) sea diplomas which is in line with the Merchant Navy Training Board (MNTB) sea training portfolio which is a set of units with learning/doing tasks and assignments. The MNTB Sea Portfolios are based on the UK national occupational standards. There are currently two portfolios for ship officers, one for Deck and one for Engineers. • Content of a typical Foundation Degree Programme (EQF Level 5) in Marine Engineering: Year one: - Mathematics - Electrics - Electronics - Engineering Management - Instrumentation and Control - Thermodynamics - Marine Engineering

		• CVET, "Schiffsoffizier", (Staatlich geprüfter Techniker), EQF level 5 or 6, duration 2 years • IVET Schiffsmechaniker (or equivalent) mandatory • CVET Technisches Befähigungszeugnisnach STCW95 für alleLeistungen und ohneEinschränkungen, EQF level 5 or 6, duration 2 years • IVET Schiffsmechaniker (or equivalent) mandatory • HE, Internationaler Studiengang Ship Management B.Sc., EQF level 6, duration 3, 5 or 4 years • University of app. Science entrance diploma and IVET Schiffsmechaniker (or equivalent or 6 month experience on sea) mandatory • HE, Schiffsbetriebstechnik B.Sc., EQF level 6, duration 3 or 4 years - University of app.	on-board training in order to allow students to collect the necessary 12 months of on-board service to become officers. Students that haven't attended ITTL can have the same possibilities after an alignment course (500 h) or after having completed a three years course (EQF6) in a maritime university.	Operations, International Regulations. - A high level of physical fitness training and leadership training is required. - Officer Cadets are expected to dedicate a lot of time to their studies and to wear a merchant marine uniform whilst undergoing training both ashore and on board ships. - Officer Cadets may be assisted in finding a sponsor for the practical sea training period during the second phase of training on the course. • Chief Mate (1 year) - Continuation in the career of a Deck Officer in the merchant marina leading to the issue of a CoC as a Chief Mate. - Candidates expected to dedicate a lot of time to their studies and wear a merchant marine uniform whilst undergoing training ashore. • Apart from the two courses	Principles - Workshop Training. Year two: - Marine Plant - Marine Propulsion Steam and Motor - Engineering Design - Mechanics - Ship Stability and Construction - Engineering Resource Management and Legislation. - On completing their foundation degree (and additional safety training/assessments), students will be eligible for the STCW III/1 Engineering Officer of the Watch Certificate of Competency, and receive academic exemptions for further certification as STCW III/2 Second Engineer. • Content of a typical curriculum for Deck Foundation Degree Programme (EQF Level 5) in Deck Officers: Year one: - Navigation - Cargo and Port Operations - Meteorology - Maritime Industry Issues - Management.

		Science entrance diploma and IVET Schiffsmechaniker (or equivalent or metalcourse) mandatory • HE, Nautik B.Sc., EQF level 6, duration 3 or 4 years - University of app. Science entrance diploma mandatory, with IVET Schiffsmechaniker (or equivalent) 3 years, without 4 years • HE Ship Operation Engineering B.Sc., EQF level 6, duration 3 or 4 years • University of app. Science entrance diploma mandatory, with IVET Schiffsmechaniker (or equivalent) 3 years, without 4 years		described above, MCAST offers qualifications at levels 3, 4 and 6 (MCAST as the awarding body): • Probationary Officer Cadet (1 year; MQF level 3) - Preparatory for the OIC Navigational Watch • MCAST Advanced Diploma in Marine Engineering (2 years on apprenticeship; MQF level 4) - First step for those wishing to embark in a career in the maritime sector; opportunities available both locally and internationally. - Introduces the basics of engineering related to marine vessels; ideal for those wishing to be introduced into the sector and obtain a formal vocational qualification. - Successful completion aims to become a technical person with sound theoretical and practical competences. - Combines modular training and work placement. • Bachelor of Science	Year two: - Voyage Planning - Maritime Law and Business - Command Management - Ship Operations - Stability. - On competing of their foundation degree (and additional safety training/assessments) students will be eligible for the STCW II/1 Officer of the Watch Certificate. • Degree level/EQF 6: - Opportunity for HND or Foundation Degree graduate to top up to a MCA Masters Certificate of Competency Unlimited to a full BSc (Hons). • As well as classroom based BEng programme, it is possible to obtain a degree in Marine Operations from Southampton Solent University's renowned Warsash Maritime Academy (WMA); this programme develops a detailed knowledge of the ship operation on modern merchant vessels which also incorporates the relevant aspects of the maritime industry as whole, both at sea and ashore. The work-based learning approach adopted as

				(Honours) in Marine Engineering (3 years on full time; MQF level 6) - Deals with design, construction, operation and maintenance of engines and machinery in ships and marine installations. - Candidate expected to develop the qualities needed for employment in situations requiring the exercise of personal responsibility, technical leadership and commercial management in complex and unpredictable circumstances as expected in the maritime industry.	part of the sea training element of the programme will prepare the students for a career at sea. The programme places a strong emphasis on real-world concepts and problem-based learning to ensure the students develop both the intended practical skills required for safe ship operations, and knowledge and competence required for a broader understanding of the shipping industry. • The UK universities offer a range of one-year Master degrees and research degree in a range of maritime subjects and candidates with good grades can progress from an HND or Foundation Degree onto the final year of an appropriate degree programme and then study for a higher degree including PhD provided they satisfy the entry requirements.
Curricula of maritime institutes	• The Ministry of Education and Culture sets the general goals for vocational education and training, determines the structure of qualifications, and the core subjects. The Finnish National Board of Education decides	• Syllabus structure of VET is negotiated by the social partners and teachers and then mandatory for all companies/VET schools. • Curriculum of HE is designed based on own experience but appreciated by competent	• Ministry of Education setting the competences to be reached during vocational education and training (National guidelines), but every school partially free to determine its own study path in terms of knowledge and skills (local curricula).	• The syllabus structure in MCAST courses/qualifications is purely linked to the STCW requirements and has no permeability with other elements. The system is conceived as a closed and separate structure operating in parallel with	• The Colleges of Further/Higher Education are responsible to local governments/councils but the Universities and other higher education providers are responsible to the relevant HEFC (Higher Education Funding Council).

	the national requirements of qualifications, detailing the goals and core contents of each vocational qualification. • The curricula are compliant with the National Qualification framework (NQF) and the European Qualification Framework (EQF). At local level, the education providers draw up their own curricula based on the core curricula provided by the National Board of Education. Each student follows an individual study plan. • The training programmes of universities of applied sciences (EQF level 6) are authenticated by The Ministry of Education and Culture; the Ministry sets the names, titles and scopes of qualifications, whereas each of the universities of applied sciences are responsible for the	bodies.	• Ministry of Education providing more freedom for ITSs and Maritime University to set their programmes with comparison to ITTLs.	the formal education path. • The OIC Navigational Watch and the Chief Mate courses provided by MCAST are not pegged to any level in the Malta Qualification Framework – MQF (derived from the European Qualification Framework). Unlike the OIC and Chief Mate, the three other courses provided by MCAST are earmarked in the MQF at levels 3, 4 and 6.	• Universities are under the domain of the HEFC and the Ministry of Universities; the MCA is part of the Ministry of Transportation.

	content and curricula of their training programmes.				
Process of certification to become an officer	Finnish Transport Safety Agency determines the safe manning of ships and issues certificates of competency and certificates of proficiency to seafarers. The agency is also responsible for matters relating to seafarers' medical certificates and medical dispensations; the Agency also keeps records on seafarers' sea-service periods. • Candidates for certificates of competency (CoC) are required to have completed an approved education and training programme, combined with the required sea-service. The requirements being met, CoCs are issued by the Finnish Transport Safety Agency without additional examination.	Bachelor's degree includes STCW license at operational level; after additional 2 years onboard, the competent body issues license on management level (ships' master) without additional examination.	Certification both for operational and management level provided by the Coast Guard with extra exams in respect to those ending the ITTLs or ITSs study path (qualification separately managed by Ministry of Transport)	• Courses to become Officer of the Watch or Chief Mate are available at MCAST Malta, the Awarding Body being Transport Malta as the National Authority for the maritime sector. • For the OOW and CM qualifications under the STCW in Malta, part of the exams are carried out internally at MCAST; the assessors are Maltese and the assessment is based on papers and documentation produced in Malta. However, part of the curriculum for these STCW qualifications is assessed by the Maritime Coastal Agency (MCA) UK, particularly key subjects such as stability, navigation and chart work. These examinations, consisting of both oral and written tests, have been kept in place by Malta even after independence and every year a team of assessors from MCA visits	• At national level, higher education programmes offered by some colleges and universities are the responsibility of the Higher Education Funding Council (HEFC) for England or for Scotland as appropriate. The responsibility is for academic programmes only. The responsibility for the Certificate of Competency (CoC) and ship officer certificate (OOW) is given to the UK's Maritime Coastguard Agency (MCA). The agency requires all HND/Foundation Degree and Degree students sit for an Oral Examination and may require some to sit its two written examinations. Before the MCA Oral Examination can be taken, all candidates must obtain the NoE (Notice of Eligibility) from the Agency which can only be obtained if all compulsory safety/ancillary courses such as fire- fighting, ERM, BRM and so forth are successfully taken. MCA as well as requiring the IMO compulsory courses requires successful

				the island to carry out this task. • Apart from the internal and external examination, a candidate to become an officer needs to undergo on-the job experience at sea in order to fulfil the minimum mandatory sea-time. Following the completion of this path: theory, internal and external oral and written examinations, sea-time, a cadet achieves the necessary requirements to become an officer hence a licence is issued in this regard.	completion of several other courses such as Efficient Deck Hand (EDH) and NARAS.
Onboard training (general practices, including, e.g., who issues and who assesses the certificate?)	• The student on-board follows the orders given and fills in the STCW compliant On Board Training Record Book, which is signed by the supervisor in charge of the training period. The students are prepared for on-board training periods with guidance on what kind of practice is needed, and the supervisor is informed on the level of knowledge of the student.	• Onboard training is managed resp. supervised by "Berufsbildungsstelle Seeschifffahrt e. V. (Responsible Body for Maritime Vocational Training) […] monitors the vocational training including that part of said vocational training that takes place outside the training locations in accordance with § 10 and supports them by way of advising the Apprentices".	• ITSs provide short on-board experiences (stages) before students get their diploma, so they represent an important moment of training but they are not counted to be summed up into the IMO 12-months. • On-board training is managed at ITS level with scheduled embarks on the same company for every student, ground based tutoring, reports from	• Sea-time is a minimum requirement to achieve the officer level and it provides for the cadet to achieve adequate expertise to work on board vessels. In general the sea-time required to achieve a higher grade is 18 months. However, if the candidate is already working in the rank s/he is qualified for, this period is reduced to 12 months. In practice if an Officer of the Watch works as Mate onboard vessels and is sitting for the Chief	• In the UK the cadet/student on sea service follows the instructions given and fills in the STCW compliant On Board Training Portfolio/Record Book which is devised by the UK Merchant Navy Training Board (MNTB). - The MNTB is known to be by far more demanding than other available sea training/record books such as ISF (International Shipping Federation). All the required on-board activities have to be signed by the training officer on board and

	• The on-board training assessment is based on the days spent on-board, which is not what the national structure of qualifications calls for. Concern has been raised on the fact that teachers should be better able to monitor and supervise students on-board. Navigation skills are evaluated by vocational skills demonstration with a simulator, where the on-board supervisor is not involved. • Efforts have been made by the maritime actors to improve the difficult situation in arranging of the on-board training periods; a maritime Apprentice Mill (HarjoitteluMylly) was established in the autumn 2012. The Apprentice Mill serves as a link between maritime institutes and shipowners. The most important task of the mill is to co-ordinate training places and inform educational institutes and	• § 8 Training location Ship: A ship is to be recognised by the responsible body as a training location if the following criteria are fulfilled: 1. the Flag State of the ship is the Federal Republic of Germany or any other contractual party to the international law agreements accepted in the context of the International Maritime Organisation and the International Labour Organisation, which contain universally recognised international rules and standards in connection with the maritime industry, 2. the Apprentices, with regard to general prescriptions of labour, social and youth protection laws, are guaranteed the same level of protection as in a Member State of the European Union, 3. the responsible authorities of the foreign Flag State have declared in writing their consent to the monitoring of the implementation of the vocational training by the responsible body,	Officers on-board and specific cadet training booklet; ITSs validate the assessment made by the tutor Officer on-board.	Mate certificate, then 12 months of sea-time are required. On the contrary if a person is not working in that rank the full 18-month period shall be undertaken. • Sea-time is not assessed but it is certified by the Ship Master and recorded in an individual book named discharge book. The discharge book bears the relevant information about the sea-time of the person such as days spent on board and conduit. The discharge book can be substantiated by certificates such as the discharge certificate and/or the watch keeping certificate that are both issued and signed by the Ship Master.	later assessed by a qualified assessor (university or a qualified external assessor). - The students are prepared for on-board training periods with guidance on what kind of practice is needed, and the training officer and later the assessor are informed on the level of knowledge, skill and competence of the student. - For Deck cadets the training at sea takes a minimum of 12 months (often 18 months is required to satisfy all the requirements, and for Engineering cadets it takes a minimum of 6 months, often 9 months or 12 months, to satisfy all the requirements).

	shipowners of the seafaring apprentice situation. The activities of the mill gather together all the Finnish maritime institutes. There are altogether 85 vessels under the Finnish flag that take students in; the smaller ones take only one student at a time, and the bigger ones take one on the deck and another on the engine department. In addition, cruise ships can take an electrician student, as well.	4. the ship has been classified by a classification society that is recognised according to the criteria of the Directive 2009/15/EC of the European Parliament and the Council dated April 23rd 2009 pursuant to common prescriptions and standards for ship inspection and monitoring organisations and the relevant measures of the maritime authorities (revised version (ABl. (official gazette) L 131 dated May 28rd 2009, p. 47) in its version applicable at a given time in Germany arid 5. there are at least two German-speaking instructors as defined in § 7 on board who have been explicitly charged with the implementation of the vocational training, one of whom should be a ship's mechanic.			
Compatibility with ECVET; modules, credits & teaching,	• Learning-outcome based approach has been implemented several years, already; the vocational qualifications have been	• ECVET (or something comparable) is not in use. Compatibility of ECVET (points, assessment of single units) with German VET-laws and beliefs is	• Competence-based education introduced by a recent reform at EQF levels 4 and 5; Italy still lacking a credit system.	• The process for the achievement of the certificates to become an Officer of the Watch or a Chief Mate in Malta follows strictly the rules of IMO	• Learning-outcome based approach has been implemented for several years, already; the vocational qualifications have been structured from modules, and

learning and assessment	structured from modules, and recognition of prior learning is recognised and validated by law. Moreover, in maritime education and training, the expected leaning outcomes derive from the STCW, as amended, which is learning outcome-based. • The measures taken towards implementing ECVET have been linked with the national reform of vocational upper secondary qualifications. The national core curriculum and the updates accordingly on the local level, took effect in the autumn 2015 as part of national vocational upper secondary education reform. The reform also involved replacing of the former study weeks with ECVET compliant credits (180 credits per vocational qualification). • The latest alignments by the Finnish government with regard	not given. Bremen University of applied sciences study programme "International degree programme ship management B.SC." uses –as all German universities- ECT-system, each semester equals 30 Credit Points. Differing from IVET, where authorities control very rigorous that the amount of vocations does not exceed the number of approx. 350 (social partners have to provide very good arguments if they want to create a new profile), Bologna-reforms led to a quite bizarre situation in German HE: In 2013 4500 (SZ 2013) different Bachelor programmes were offered, often very similar, with only 2 or 3 differing modules. As a consequence of this horrible number recognition of modules from other universities became more complex in general, but for the specific case of MET, due to the small amount of universities offering profiles in the sector and	• MET poorly meeting the requirements of ECVET with not much experience on ECVET at EQF levels 4 and 5; at ITS level ECVET possibility for ECVET to find more room, at least in the first phase of the next probable application of a credit system. • Maritime University using ECTS system with great success.	and is completely in line with STCW requirements. The certificates issued are recognised within the maritime sector both in Malta and in all countries adhering to the STCW convention. However, there is no link with the Malta Qualification Framework and with the European Qualification Framework. The missing sessment • link with the EQF makes it not applicable any learning-outcome based approach such as ECVET, as the syllabus is purely linked to the STCW requirements and has no permeability with other elements. The system is conceived as a closed and separate structure operating in parallel with the formal education path. • The MCAST qualifications other than the Chief Mate and the OIC are earmarked in the Malta Qualification Framework at levels 3, 4 and 6, but none of the qualifications make reference to ECVET and to the ECVET points. Although in Malta the	recognition of prior learning is recognised and validated by law. • The UK system for some time had a similar credit system to ECVET and there are those who of the view that the EU ECVET is based on the UK vocational education system. ECVET credits are no different to ECTS. • In the UK it is a normal practice for two institutions (national or worldwide) to prepare a memorandum of understanding (MoU) and agree on exchanging students/cadets. The practice requires the two institutions to review another programme and ensure the students are not disadvantaged and progression routes are feasible and fair. • Assessment in the UK vocational education system is based on pass/fail but many colleges and universities for some modules allow other grades such as merit and distinction. There are also a system of % marking provided by some colleges and universities. Pass is around 40 to 50 % while merit is often for

	to VET are putting more emphasis on learning outcome based approach and cooperation between school and industry; learning processes in the work places are being promoted by, e.g., creating a new training agreement model and decreasing the economic and administrative burden for the employer from apprenticeship training. • The crediting system used in universities of applied sciences is ECTS. • Assessment in vocational upper secondary qualifications is based on vocational skills demonstration; courses as pass/fail, except for the modules to supplement vocational skills (general subjects to all vocational upper secondary qualifications), which are graded from 1 to 3.	the small amount of students, usually recognition is quite smooth. Students, holding a VET "ship mechanic" (or comparable) degree are exempted from first semester (internship 1) but not from internship 2 (semester 6); there they should apply what they have learnt during semester 2-5. Currently shipping companies are arguing that this mandatory 2nd internship is expensive and applied for a special programme (off board) for ship mechanics in semester 6 – whether this will lead to a re-structuring of study programme is open. Experiences with foreign students (or German students in partner universities (Cadiz, Izmir)) are very positive; exchange is based on long-lasting networks and mutual trust. A "mobility window" within 4th semester was established; including a common syllabus (incl. STCW) with partner universities. Language of instruction at Bremen University of		conversion rate of ECVET and ECTS is established by Law (1 ECTS = 1 ECVET = 25 hours of learning) there is no reference in the courses mentioned above to ECVET and learning outcomes recognition. • The 3 qualifications mentioned above at level 3, 4 and 6 could be using ECVET in an easier way than those qualifications that are not earmarked in the Malta Qualification Framework. However, they would need to be further analysed in terms of learning outcomes and the process for validation of such learning outcomes, especially in view of enhancing mobility and linking the qualifications or part of them to similar ones obtained in other EU institutions. • In Malta the assessment of the competences achieved is done in different ways depending on the study paths. While in the advanced diploma in marine engineering level 4, the assessment varies and	a performance above 65 % and distinction is for a performance above either 80 or 85 %. • Colleges and universities accept APL (Accreditation of Prior Learning) which can be for both formal and informal learning. • Nationals from other counties provided they have followed a programme acceptable to the MCA can apply for the NoE and once the eligibility has been granted the candidates may have to take the MCA's written exams and/or the oral exam depending on the agreement between the two countries. • Marine Engineering and Deck Officer Programmes at EQF level 5: - Academic learning in primarily classroom-based, supported by practical aspects that must be carried out at sea - Assessment as a mixture of individual and group coursework, student presentations and project work, as well as written examinations and timed

	• Assessment of study units in universities of applied sciences is based on learning objectives defined for the unit concerned; pass/fail or assessment scale from 1 to 5.	applied sciences is English. • German VET system is not based on creditable units. Programmes are seen as holistic vocational qualifications; learning outcomes are not assessed separately but in mid-term examinations and at the end of programme (cp. chapter 1.9). The only aspect within German VET-law that could by interpreted as a form of crediting is the opportunity for good apprentices (good grades both in school and in company) to shorten the programme by 6 month. But in MET even this is not possible due to minimum time requirements onboard. VET providers have no experience with ECVET or comparable approaches and are not very convinced about the toolbox, assessing single units, or introducing a fixed amount of points for a unit are not seen as a step forward. Language of lessons is mainly German, partly English; at the end of programme apprentices		is dependent on Study Unit, the same course envisages a mandatory final project. • For the OIC Navigational Watch course, the students are assessed for theory and practice including oral exam at the end of first and second semester. These assessments are part of the requirements of the STCW quality standards. Where conducting of assessments involves the use of simulators the students are examined in the practical experience of simulator to the satisfaction of the examiner. • In the Chief Mate course students are assessed for theory and practice including oral exam at the end of the course. These assessments are part of the requirements of the STCW quality standards. Where conducting of assessments involves the use of simulators the students are examined in the practical experience of simulator to the	exercises. - As part of the sponsored merchant navy officer cadetship the students carry out training at sea on their sponsoring company's vessels. • Progression to Degree level/EQF 6: - Flexible course offering the opportunity for HND or Foundation Degree graduate to top to a MCA Masters Certificate of Competency Unlimited to a full BSc (Hons). consisting of: - Maritime and Commercial Law - Maritime Issues in the Contemporary World - Work-based Project - Options: - Safety Management - Financial Management - Maritime Technical Management. - The students are expected to study a total of five units (three core units and two options) via blended learning, commencing with a 15-week period of attendance at the academy. They will then complete the course via distance learning over a period of 12 months,

		should have reached Level B1 (independent) on European competence scale. • In HE ECTS (1 year = 60 credits) is used; practical semesters onboard are accredited with ECTS, also. • § 13 Final Examinations: - (1) The final examination consists of Parts 1 and 2 that are taken at different times and are free of charge for Apprentices. The aim of the final examination is to establish whether the candidate has acquired professional competence. In the final examination the candidate shall be required to prove that he has mastery of the necessary vocational capabilities, possesses the essential knowledge and skills and is familiar with the subject matter being taught. The final examination may be retaken twice. - (2) The final examination is deemed to have been passed if, with regard to		satisfaction of the examiner. • In the probationary officer cadet course, the students are assessed for theory and practice at the end of first and second semester. These assessments are part of the requirements of the STCW quality standards. Where conducting of assessments involves the use of simulators the students are examined in the practical experience of simulator to the satisfaction of the examiner.	supported by their supervisor and course leader. - The course is assessed on individual and group coursework, presentation and project work, including dissertation and examination.

		the manufacturing of the examination pieces and execution of the work samples (practical examination) and the written examination, a grade of “adequate” at least shall have been achieved in each one. - (3) For the purpose of determining the overall result of the practical examination and the written examination, Part 1 of the final examinations shall be weighted at 35 per cent and Part 2 at 65 per cent. - (4) After the final examinations have been passed the candidates are to be issued with a final certificate according to the pattern designated by the responsible body. • At universities it’s up to the lecturer how he assesses the learning outcomes; usually written examinations or interviews are chosen and rated with a grade between 1 (very good) and 5 (failed). For module “ship command IV”, which includes the relevant STCW chapters,			

		a new assessment scheme was developed: Students work in small groups on typical STCW-relevant tasks in a simulator; focus of assessment is the ability to apply knowledge and skills in different roles; no grades are in use: student may only pass or fail.			
Harmonization of Maritime Education and Training (MET)	• It is generally considered amongst the training providers that harmonisation of MET on the European level, that is, uniform qualification requirements would be desired. In practice, however, this is a challenge.	• Stakeholders from German VET provider are very convinced of the way STCW is integrated in German curriculum and the unique share of responsibilities between shipping companies, VET schools and the responsible body for Maritime Vocational Training. It is not very realistic that other European countries implement an apprenticeship scheme in MET and any other kind of harmonisation would lead to a lowering of German standards or a restructuring of responsibilities. So there is no interest in a uniformed curriculum in Maritime Education and Training on	• Harmonization of MET on the European level is commonly desired, but to some extent is recognised that harmonization should concern mainly the age range of students for the different courses; common STCW base can be developed by "best practices trade" at a European level (extra courses, new teaching methods) to improve the training quality level.	• MET actors are strongly supporting further harmonization of MET. However, the MET actors are not concerned on the national level, since in Malta MET training is purely linked to the STCW requirements.	• Attempts have been made by UK colleges and universities as well as external bodies such awarding bodies such as BTEC/Execel/Pearson, MNTB and MCA to harmonise the UK system as best as feasible. • An attempt was made by the EU to harmonise the maritime education and training - see project UniMET, *www.unimet.pro* to great extent in several EU member states as well as in Turkey. Generally all MET programmes are IMO STCW compliant. A review of the UniMET reports clearly suggest that many of these programme are not that different to the IMO Model courses to either 7.03 and 7.02 or 7.01 and 7.02 respectively. In the main it is

		a European level. • From universities' perspective there is already a broad level of harmonisation, as the successful student exchange proves. On the other hand sometimes curricula are similar, but in practice they are interpreted and taught differently - in this aspect an orientation towards "apparent good practice"; on how to develop good courses based on technical units like STCW would be desirable. A very technical aspect of harmonisation was mentioned, also: European universities that offer MET should harmonise the starts of the semesters - to assure smooth mobility.			the local/national requirements which need to be added.
STCW; Protection of the marine environment / Marine environmental awareness in the curriculum	• In the operational level studies the STCW requirements are being followed as well as the IMO Model course 1.38, although the extent of hours recommended in the Model course cannot	• Marine environmental awareness courses are integrated part of the VET curriculum, STCW standards are largely exceeded. STCW-certificates of "rating deck" and "rating engines" are issued together with the	• ITTLs offer a study path that complies with a major percentage (about 75 %) of the STCW requirements in terms of topics and number of hours. • ITTLs don't strictly follow the IMO Model courses	• The protection of the marine environment/Marine environmental awareness is incorporated in the curriculum, particularly in that for Chief Mate at management level, MARPOL is applied	• All MET Programmes, namely, HNDs, Foundation Degrees and Degree programmes incorporate the following requirements: - IMO 7.04 - Watchkeeping Engineer Officer – Operation - IMO 7.03 - Watchkeeping Deck Officer – Operation.

	be reached because of the requirements in the national framework. The universities of applied sciences (EQF level 6) are more flexible with regard to the content and curricula of their management level deck and engineering programmes, and are not facing the same challenges as the vocational upper secondary institutes (EQF level 4) with their limited time frames in meeting the requirements of the STCW. • Marine environmental awareness is embedded in compulsory studies in both, deck and engineering programmes; it is taught as part of "Seamanship and Maritime Management" course and in connection with the international conventions. Teaching methods include classroom hours, group assignments and self-study. Pedagogical	journeyman's certificate, certificate "watchkeeping" already after the first part of final examination (after 18 month). • Marine environmental awareness is an own part of curriculum.	and don't reach the total teaching hours requested, but the curricula are built on the basis of the National guidelines and the STCW Tables. • ITSs and the Maritime University go beyond the STCW, and the Ministry of Education gives them more freedom to set their Programmes in respect to ITTLs. • All institutes offer courses in compliance with the STCW embedded into general study path, very difficult to separate the STCW topics from the general scheme overall for ITTLs, the training starting at the age of 15 - 16 years when general education yet needed. • In the ITTLs Marine environmental awareness is embedded into the study path in both, deck and engineering Programmes and only about 10 hours are dedicated to it. • At ITS level a specific course is provided	thoroughly. The environmental issues are dealt with especially in the ship management courses and deal with sewage management, garbage management, oil pollution and air pollution. • At lower levels, such as Officer of the Watch, the environmental issues are not explained from a theoretical point of view, but cadets will have hands-on experience on such matter during their sea-time and at operational level.	• All degree programmes also satisfy the requirement of the following: - IMO 7.01 for Deck Officers/Chief Mates/Masters – Management - IMO 7.02 for Engineer Officers/Chief Engineers – Management. • The following EQF level 6 degree programmes are provided by several universities: - Bachelor of Nautical Science or Navigation (360/240 credits/ECTS) – Operation/Management - Bachelor of Marine Engineering (360/240 credits/ECTS) - operation/management. • The arrangements for the protection and the marine environmental/marine environmental awareness are similar to other countries such as Finland. The requirements are embedded in compulsory studies in both, deck and engineering programmes. • The requirements are also transformed into a 2-day course for seafarers already

	freedom is allowed for teachers. In addition, individual institutes provide their own optional courses, e.g., ”Eco training” course focusing on ecologically optimizing the steering of a ship.		(MARPOL/ ENVIRONMENTAL - 20 hours).		working in industry and a 5-day course for cadets who did not do part, or all, of the compulsory requirements due to being at sea training.

Footnotes

[i] Vocational education and training

[ii] The International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (or STCW), 1978, as amended, sets qualification standards for masters, officers and watch personnel on seagoing merchant ships. STCW was adopted in 1978 by conference at the International Maritime Organization (IMO) in London, and entered into force in 1984. The Convention was significantly amended in 1995 and 2010, the latter often being referred to as "the Manila Amendments".

[iii] Maritime Education and Training is a term commonly used in the context of merchant marine instruction.

[iv] http://www.imo.org/pages/home.aspx

[v] Support, operational and management levels are the levels of competences defined in the International Convention on Standards of Training, Certification and Watchkeeping for Seafarers (STCW)[v]. Support level refers to the competence level of Ratings; operational to the level of Mates and Assistant Engineers; and management to the level of Masters, Chief Mates and Chief Engineers.

[vi] The European Qualifications Framework (EQF) is common European reference tool that helps communication and comparison between qualifications systems in Europe. Its eight common European reference levels are described in terms of learning outcomes: knowledge, skills and competences. This allows any national qualifications systems, national qualifications frameworks (NQFs) and qualifications in Europe to relate to the EQF levels. Learners, graduates, providers and employers can use these levels to understand and compare qualifications awarded in different countries and by different education and training systems. Its main role therefore is to make qualifications more readable and understandable across different countries and systems.

[vii] http://www.eua.be/eua-work-and-policy-area/building-the-european-higher-education-area/bologna-basics.aspx

[viii] European Credit Transfer and Accumulation System (ECTS)
http://ec.europa.eu/education/ects/ects_en.htm

[ix] German maritime HE programmes last 4 years, but if a student has already finished successfully the IVET programme "Schiffsmechaniker" then this is credited: The student can skip one or two practical semesters.

[x] http://www.cimo.fi/instancedata/prime_product_julkaisu/cimo/embeds/cimowwwstructure/18941_Finland_in_Focus_web.pdf

[xi] *Monitoring ECVET implementation strategies in Europe in 2013, Luxembourg: Publications Office of the European Union, 2014* http://www.cedefop.europa.eu/en/publications-and-resources/publications/monitoring-ecvet-implementation-strategies-europe-2013

[xii] The Common European Framework of Reference for Languages

[xiii] The White List identifies the countries that have demonstrated a plan of full compliance with the STCW Convention and Code as revised in 1995. The White List was developed by an unbiased panel of "competent persons" at the IMO. The criteria used to develop the list included what system of certification (licensing) each administration would have, the process of revalidation for certificates, training center oversight, port state control, and flag state control.

[xiv] The European Qualifications Framework (EQF) is a translation tool that helps communication and comparison between qualifications systems in Europe. Its eight common European reference levels are described in terms of learning outcomes: knowledge, skills and competences. This allows any

Co-funded by the Erasmus+ Programme of the European Union

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