SKILLSEA

TRAIN-THE-TRAINER MANUAL

MAIN EDITOR(S)	Elin Dorthea Kragesand, SIMAC, Denmark edk@simak.dk
CONTRIBUTERS	Elin Dorthea Kragesand, SIMAC, Denmark edk@simak.dk
	Carolyn Robinson, Blackpool and The Fylde College, UK carolyn.robinson@blackpool.ac.uk
	Alina Prylipko, Blackpool and The Fylde College, UK alina.prylipko@blackpool.ac.uk
REVIEWER(S)	Formare - Polo nazionale formazione per lo shipping scarl, Italy
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Introduction

The Train-the-Trainer Manual on Educational Packages (the Manual) aims to provide the support necessary for maritime lecturers, trainers, and instructors in implementing, fully or partially, educational packages developed by the SkillSea project. This Manual is designed for lecturers experienced in maritime education and training and does not cover basic education principles or the nature of maritime education and training (MET).

National MET systems and the backgrounds of students may vary considerably across jurisdictions. In addition, SkillSea partners agree that technological developments in many areas of the maritime industry are, and will remain, fast-paced. Moreover, certain aspects of the future of shipping – such as the feasibility of various alternative fuels – have not been fully established. For these reasons, development of ready-to-use educational packages has been deemed inappropriate. Instead, SkillSea educational packages have been designed to demonstrate examples of sustainable cooperation among industry stakeholders and MET institutions in the development of future-focused courses for maritime education.

It is expected that SkillSea educational packages will be used to assist the development and implementation of a future-focused programme or course. However, the learning outcomes, syllabus and other content of the course might need to be customised to meet the learning profiles of students as well as to account for their current knowledge base, skillset, and the expected learning environment. If such changes are made, lecturers must ensure that various aspects of the course – such as learning outcomes, teaching methods and assessments – are realigned accordingly.

The proposed educational packages offer example lesson plans and teaching materials. The learning outcomes, teaching methods, and assessment methods have been aligned for demonstration purposes. It is expected that implementation of these educational packages will require development of learning and teaching resources and may require the professional development of the lecturers to update their knowledge with the latest industry trends.

Background to the SkillSea project

The purpose of this section is to provide a background to the SkillSea project so the reader may better appreciate its aims and objectives and the nature of the educational packages.

The SkillSea project aims to ensure that Europe's maritime professionals possess required digital, green, and leadership skills for the rapidly changing international maritime labour market. This project seeks to bridge the gap between the maritime industry and its educational sector, to produce a sustainable maritime skills strategy and, most importantly, to establish structural cooperation among stakeholders.

Three of the objectives of the SkillSea project are:

- to analyse the effect of technological developments on the industry's skills requirements
- to identify current and future skills gaps and to develop educational packages to bridge those gaps
- to enable increased mobility of maritime professionals in the industry[1]

To achieve these objectives, project partners completed extensive research into the needs of stakeholders, such as employers and training providers (see Figure 1 for the structure of the project).

Prior to implementing any of the educational packages, lecturers should familiarise themselves with the outcomes of this research – in particular the reports, including '*Current and skills needs (Reality & Mapping)*' and '*Future skills and competence needs (Possible future development)*' – to gather relevant background information that explains the design of the package. Such reports may also generate new ideas for curriculum development[2].

Maritime education and training aspects of the SkillSea project were addressed in Work Package 2 (Figure 1). This work package examined the implications of technological developments in the maritime industry for MET institutions. This work package also offers the following materials:

- [Guide to design and Implementation of education packages](#)

- [Educational packages for specified skills](#)

- [Opportunities for structural cooperation](#)

- [Guide on business/education partnerships](#)

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[1] For a list of project objectives https://www.skillsea.eu/index.php/about/what-is-skillsea

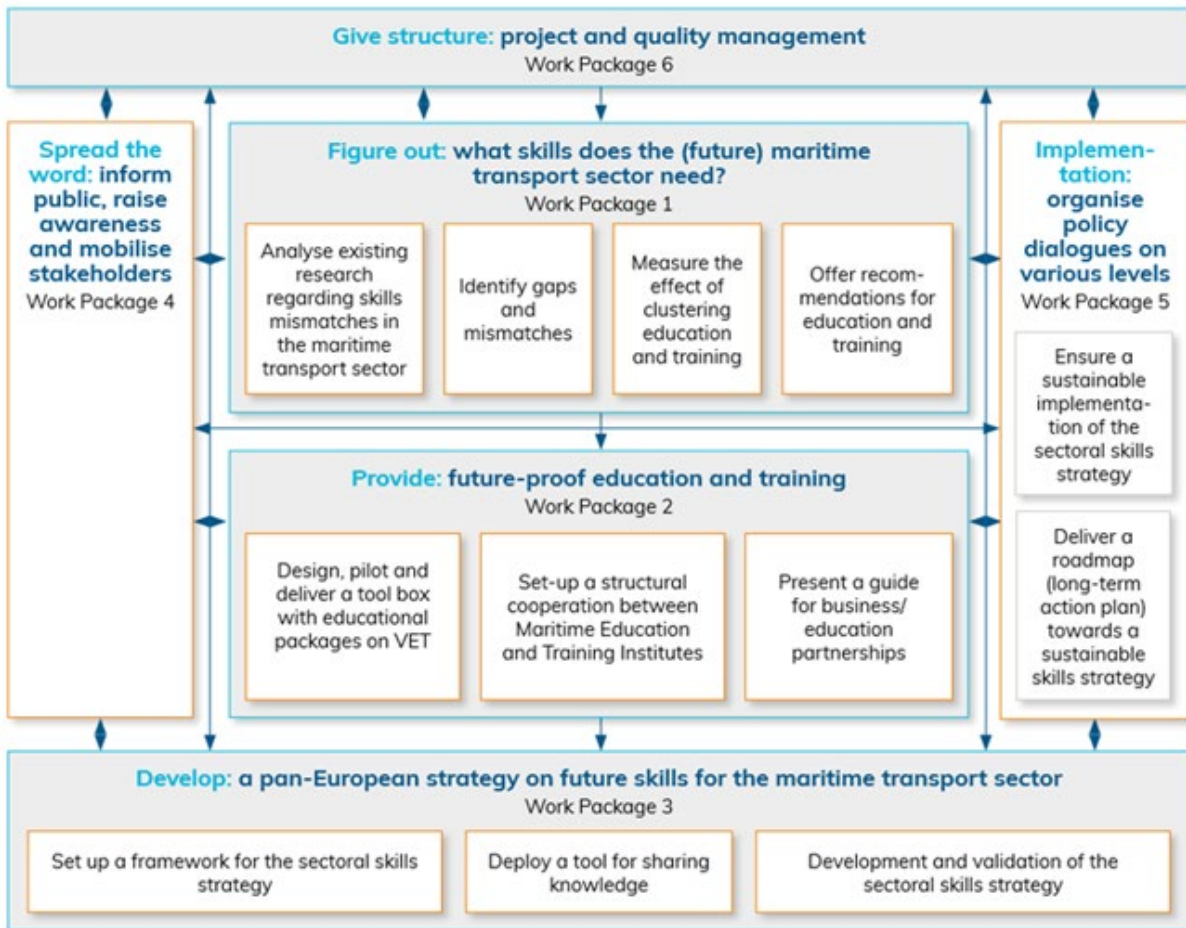[2] Please visit https://www.skillsea.eu/index.php/results/public-deliverables.

Figure 1. SkillSea project management structure

The development of new future-focused courses is suggested in accordance with proposed Toolbox Design Guide, which is aimed at supporting stakeholders in their collaboration during the development of the course.

Specific outcomes of research, and consultations with stakeholders, have resulted in the identification of a number of skill gaps, which have been developed into the following educational packages:

• Green Skills 1: Environmentally friendly and sustainable ship operation

• Green Skills 2: Understanding and using performance data

• Digital Skills 1: The Digital Seafarer

• Digital Skills 2: Maritime Cybersecurity

• STEM

• Leadership

• Intrepreneurship & Innovation

Interestingly, as demonstrated during the piloting of educational packages, MET institutes adopt various approaches to implementing educational packages into their curriculum. This flexibility was built into the educational packages to account for differences among various jurisdictions, and their approaches to maritime education and training. Lecturers may also wish to review the approaches, and some of the best practices, shared by the organisations that have piloted these educational packages.

In the following section, this Manual introduces the various MET documentation available within the SkillSea project, ranging from the Toolbox Design Guide to specific educational packages. In addition, this Manual provides suggestions for the implementation of these documents, including suggestions for pedagogical approaches.

Introduction to educational packages

The educational packages have been designed to facilitate the integration of future-focused topics into maritime curricula. The packages have the flexibility to ensure the relevance and customisation according to the varied needs of the students in all maritime education and training institutions, whilst remaining considerate of the intended learning outcomes. In support of the utilisation of these educational packages, the key focus for guidance relates to three documents:

1) **The Toolbox Design Guide** - this guide supports the tutor as they explore the Toolbox Template and Educational Package Toolbox by providing further and more detailed explanations of each section. The specific goal of the guide is to support the planning, delivery, and assessment of each package (Figure 2).

2) **The Toolbox Template** – this is the framework around which all educational packages are written to ensure a consistent approach (Figure 3). Toolbox Design Guide, page 12.

3) **Educational Package Toolbox** – these have been specifically written for each educational package. The template has been populated with key, package-specific information and guidance (Figure 4).
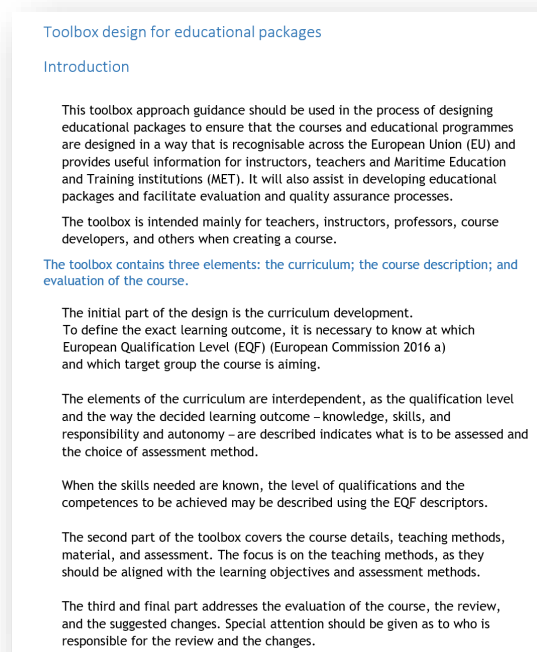
Toolbox design for educational packages

Introduction

This toolbox approach guidance should be used in the process of designing educational packages to ensure that the courses and educational programmes are designed in a way that is recognisable across the European Union (EU) and provides useful information for instructors, teachers and Maritime Education and Training institutions (MET). It will also assist in developing educational packages and facilitate evaluation and quality assurance processes.

The toolbox is intended mainly for teachers, instructors, professors, course developers, and others when creating a course.

The toolbox contains three elements: the curriculum; the course description; and evaluation of the course.

The initial part of the design is the curriculum development.
To define the exact learning outcome, it is necessary to know at which European Qualification Level (EQF) (European Commission 2016 a) and which target group the course is aiming.

The elements of the curriculum are interdependent, as the qualification level and the way the decided learning outcome – knowledge, skills, and responsibility and autonomy – are described indicates what is to be assessed and the choice of assessment method.

When the skills needed are known, the level of qualifications and the competences to be achieved may be described using the EQF descriptors.

The second part of the toolbox covers the course details, teaching methods, material, and assessment. The focus is on the teaching methods, as they should be aligned with the learning objectives and assessment methods.

The third and final part addresses the evaluation of the course, the review, and the suggested changes. Special attention should be given as to who is responsible for the review and the changes.

Figure 2. The ToolBox Design Guide extract

Figure 3. The ToolBox Template extract

Figure 4. Example of Educational Package Toolbox extract

The purpose of this section is to support the users as they explore the content of the toolbox of specific educational packages, and to explore the rationale behind each section so they may access and utilise all the resources available. Best practice will also be shared by the organisations that piloted the educational packages, including reviews of their experiences when implementing the packages and their reflections on lessons learnt. It is important to note that the information in the Toolbox Design Guide provides the flexibility required to support the needs of differing jurisdictions and educational organisations.

Toolbox Design Guide

The Toolbox Design Guide is divided into sections, the content of which will be used as the main guide for the delivery and assessment of the educational package.

Learning objectives – these describe the overall aim of the teaching intentions and the general competencies the students will have acquired after having completed the specific educational package. This is to ensure that educational packages meet the needs of the industry.

Target group – this has been identified as being professionals expected to perform the duties requiring the competencies defined in the learning objectives. Target groups may be described by their position in the company's structure (for example, ships' superintendents, onboard or shore-based personnel) or by their assigned tasks and responsibilities (such as the person responsible for cybersecurity in a shipping company).

Entry requirements – these are the minimum requirements for the students to participate in the educational package. These may be levelled to the EQF and industry experience.

Duration – this is provided in terms of guided and self-study hours. This is to support lecturers as they plan, deliver, and assess the content. However, as with any other sections of the educational package, the proposed duration is only a suggestion and should be reviewed prior to delivery.

Assessment – here, details of the suggested assessment of the students' achieved learning outcome are provided. It is possible that formative assessment strategies will be designed in preparation for a final summative assessment.

Course outline – the overview has been broken down into topics of coverage for each session/lesson. Exemplar lessons are provided in each package. The topics could be further adapted to reflect the specialisation and interests of your students.

Learning outcomes - these outcomes are split into three sub-sections – knowledge, skills, and responsibility and autonomy. The packages can be adapted to suit different groups of students who have slightly different entry competencies. To ensure the alignment and suitability of levels, the formulation of learning outcomes may need review. Lecturers need to ensure the learning outcomes are level-appropriate for students and this is reflected in their wording, such as by the action verbs used.

Teaching methods – suggestions have been made regarding the methods of delivery used within the package. It is expected that the alignment between the learning activities, outcomes and assessments must be clear, and all students must have the opportunity to construct meaning from what they learn. Examples of formative assessments included may be adapted and used to monitor student learning and progress.

Teaching materials – suggested materials and links to further information are included in the exemplar lessons. It is important to note that the materials included are examples and it is expected that the lecturer will create resources specific to learning outcomes, ensuring currency to their own national and organisational regulations.

Assessment/exam – summative assessments are suggested to provide the student with the opportunity to demonstrate achievement of the learning outcomes.

Course review – as with all training courses, the evaluation/review of these packages is essential to ensure that they remain current and of the correct quality. Students are provided with opportunities to evaluate the delivery and content of the package. This process should fit with the quality assurance measures adopted in your organisation.

The Educational Package Toolbox document for the educational package is also supported by a suggested table of constructed alignment. It provides a further level of detail in relation to the content. The content should be adjusted to include latest developments in the industry, including regulatory requirements, industry guidance and technological developments. In addition, these sections should be adapted to reflect national legislation and to highlight topics which are considered key to the focus of the training programme.

Pedagogical approach

This section offers an overview of the pedagogical approaches employed in the creation of the various SkillSea educational packages. It addresses the pedagogical approach covering the overarching rationale behind the SkillSea toolbox, as it is presented in the Toolbox Design Guide and the learning, teaching and assessment methods used in the educational packages.

The pedagogical approach has been decided by the developers to match the learning outcomes. Teaching methods are presented in the Toolbox Design Guide (Toolbox Design Guide 3. On teaching methods).

The learning objectives are the result of the knowledge and skill needs of the maritime industry, as identified by the SkillSea project in cooperation with stakeholders in shipping, as described in section 1 of this Manual.

The overarching principle for the educational packages is based on the theory of constructive alignment (Biggs & Tang 2011). The main objective of this theory is to ensure an alignment between learning outcomes, learning activities, and assessment.

Learning outcomes are described using action verbs as they are linked to the assessment method. Learning outcome descriptors: knowledge, skills, and autonomy and responsibility (Cedefop 2017)

Assessment methods are chosen to allow the participants to demonstrate that the intended learning outcomes have been achieved.

Teaching methods are aligned with the assessment method, as the learning process should prepare the participants for the assessment (Toolbox Design Guide, 2. Assessment methods).

Many SkillSea educational packages utilise a virtual learning environment as the preferred platform for student resources and support material. Certain packages are also designed to be delivered online, on site or as blended learning, as determined by the training provider. (Toolbox Design Guide 3. Teaching methods).

Examples of educational packages

Below find examples of how the Toolbox Design Guide has been used.

Digital Skills 1: The Digital Seafarer

The course aims to provide maritime professionals with the knowledge and skills required to use information infrastructure onboard modern ships to enable them to assess, analyse and act upon available data.

The educational package Digital Skills 1 goes beyond generic digital skills training courses and was developed to enable students to familiarise themselves with ship-specific information infrastructure and to complete the course whilst at sea. This requires the course to balance semi-autonomous learning with a supportive virtual environment that incorporates teaching, learning and assessment.

The assessments used in this package include an initial diagnostic quiz, regular formative tests and a final quiz used as a summative assessment. The guidance in the educational package toolbox indicates that all formative assessments are to be completed within a Virtual Learning Environment (VLE).

VLE is further explained in the Toolbox Design Guide appendix 3 ([Toolbox Design Guide, 3. On teaching methods](#)).

Digital Skills 2: [Maritime Cybersecurity](#)

The intended learning objective of Digital Skills 2 is to provide maritime professionals with the knowledge and skills required to minimise ships' vulnerability, prevent main cyber risks, and respond effectively to cyber incidents and attacks.

The course is designed to be delivered using blended learning with classroom lessons supplemented by asynchronous e-learning modules. Simulation and practical activities such as demonstrations of cyber-attack support the training. Formative assessments are included in the form of short self-checking or multiple-choice tests. A practical exercise, a case study or simulation is suggested for the final assessment.

Green Skills 1: [Environmentally friendly and sustainable ship operation](#)

On completion of Green Skills 1, the students shall attain the knowledge, skills, and competencies required for operating a vessel in an environmentally friendly and sustainable way.

The package aims to further the participants' environmental awareness. To achieve this, Socratic questioning is used to help the participants develop higher order thinking skills and to reflect on their choices and their consequences. ([Toolbox Design Guide, appendix 3](#)).

The Green Skills 1 assessment case scenario is based on simulated ship operation.

The use of simulators as one of the teaching methods offers the possibility of repeating exercises under different conditions and for reflections in action as well as reflections on action during the debriefing sessions.

Green Skills 2: <u>Vessel Performance Management Systems</u>

The intended aim of this course is to provide the participants with the knowledge and skills required to comply with or exceed environmental requirements by understanding and using performance indicators.

The course is designed to be delivered in a classroom, as it relies on dialogue, discussions, and group work.

Case studies, real-life or fictitious, are suggested as examples for analysis. A key element of the course is analysis of the thesis data provided by the European Maritime Safety Agency (EMSA). The main assessment case runs through the entire span of the course and the ongoing analysis of data will be accumulated in a final portfolio.

<u>Science, Technology, Engineering and Mathematics STEM</u>

SkillSea Future Skills and Competence Needs (Possible Future Development) report stresses that future maritime professionals will require a solid foundation and understanding of science, technology, engineering and mathematics (STEM). This educational package aims to teach students the relevant fundamental concepts surrounding numeral, scientific and engineering skills and their application in the shipboard context. This knowledge is expected to allow maritime professionals to improve their achievement and success during their studies in nautical, electro-technical and engineering programmes, provide the underpinning knowledge required to pursue further technical careers and enable them to appreciate the changing nature of the maritime industry.

<u>Leadership</u>

The Leadership EP follows skill needs identified in Work Package 1 based on a literature review and field research in seagoing and shore-based personnel. Leadership has been indicated as an essential future skill for those wishing to pursue a career in shipping. The course aims to provide participants with theoretical knowledge on leadership and enhance their leadership skills and focuses on five parameters: teamwork, communication, motivation, cultural awareness and conflict handling. The course focuses on providing knowledge and skills related to: - Cultural Diversity and Leadership in a multicultural industry - The importance of communication skills and motivation - Team leadership and conflict handling.

Intrapreneurship and Innovation

Intrapreneurship is a way to innovate within one's own organisation. This course aims to introduce innovation and intrapreneurship to create opportunities to develop personal and corporate skills and competencies. The course will introduce key theories, models and stakeholders.

References

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