



# Toolbox design for educational packages

## Introduction

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

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

**The Toolbox contains three elements: the curriculum, the course description, and the course evaluation.**

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 for.

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

When the skills needed are known, the qualifications and the competencies 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 to who is responsible for the review and the changes.

# The Toolbox

Each Moodle page –each educational package – should include a label with the name of the partner who developed the course and the date it was updated.

## 1. Curriculum

### Learning objectives

The learning objective is the statement of teaching intentions and describes the specific areas covered in the course or a block of courses. The learning objective describes the overall aim of the teaching intentions and the general competence the student will have acquired after completing the course (Cedefop 2017).

### Target group

Course target groups are identified as professionals expected to perform the duties requiring the skills and competencies defined in the learning objectives. Target groups may be described by their position in the company's structure (ships' superintendents, for example) or by their assigned tasks and responsibilities (such as the person responsible for cybersecurity in a shipping company).

### Entry requirements

Entry requirements should define minimum competence requirements for participating students. The expected requirements must be described using descriptors equivalent to the learning outcomes to clarify the level difference. Where relevant, state-specific requirements such as reading, language or maths.

### Duration

The course duration is the time needed to train the student from the present level to the desired level of qualification, including guided learning hours breakdown (such as lectures, workshops, and seminars) and independent study.

Duration depends on educational level, the current level of knowledge, and the specific learning outcomes.

The amount of learning outcomes should be achievable in the time frame suggested.

If the course is defined based on ECTS [learning outcome/certificate-based], a description of ECTS for each educational package is needed. If ECTS is given according to the EQF level, calculate the amount.

### Assessment

The assessment method should apply to and mirror the desired learning outcome.

The choice of learning outcome forms the basis for the assessment method and for what is to be assessed. Assessments should be competence-based as far as practicably possible and check the ability of the student to perform relevant tasks in a practical environment.

The assessment method can be one or a combination of several types of evidence, such as tests, written, multiple choice, practical tasks, or simulators.

See 2 On assessment methods.

## 2. Course description

### Course outline

The course description includes information on the specific elements and subjects to be covered in a course or a block of courses and information on teaching methods and materials.

### Learning outcome

We propose combining the 8 EQF levels and learning outcome descriptors: knowledge, skills, responsibility, and autonomy (European Commission 2016 a).

The Recommendation of the European Parliament and the Council on the establishment of the European Qualifications Framework for Lifelong learning (5) defines the concepts of knowledge, skills and competence. Knowledge is described as theoretical and/or factual; skills are described as cognitive (involving the use of logical, intuitive and creative thinking) and practical (involving manual dexterity and the use of methods, materials, tools and instruments); and competence is described in terms of responsibility and autonomy. In this context, 'skills' refers to applying knowledge to complete tasks and solve problems. (European Commission 2016 b:3)

As most EU member states have implemented National Qualification Frameworks (NQF), as shown in the European Centre for the Development of Vocational Training (Cedefop) overview (Cedefop 2019), using the EQF descriptors knowledge, skills, and responsibility and autonomy in the SkillSea project provides a common understanding of the specifications.

The educational packages define the intended learning outcome:

Learning outcomes are given as a clear statement of course objectives –what knowledge, skills and competence, responsibility and autonomy the student is expected to have achieved after the course. The learning outcomes should be described recognisably.

Using action verbs corresponding to the EQF or a specific profession also makes transparent how the student is expected to demonstrate the attained knowledge, skills and responsibility and autonomy.

See 1 On learning outcome.

## Teaching methods

Teaching and delivery methods should suit learning outcomes and assessment methods. These methods should be progressive and take into account the latest technology available.

Blended learning, individual versus group work, e-learning, webinars, simulator exercises, on-site versus online, lectures, lab work, workshop, classroom activity, traineeship, sailing time, student exchange (giving cultural experience, language), work experience, augmented reality (AR) or virtual reality (VR), research work, information and communication technologies (ICT).

- Blended Learning
- individual versus group work
- e-learning
- webinars
- simulator exercises
- on-site versus online lectures
- lab work
- workshops
- classroom activity
- traineeship/sailing time
- student exchange (giving cultural experience, language)
- work experience
- augmented reality (AR) or virtual reality (VR)
- research work
- information and communication technologies (ICT).

Formative assessment may be included in the teaching programme – rubrics, hand-in assignments, written and/or oral feedback, for example, provide the student with information on learning progress.

See 3 On teaching methods.

## Teaching materials

Educational packages may include teaching materials and be developed to allow delivery by a subject expert. Materials must be chosen to match the learning outcome and assessment method.

The delivery methods and materials for training such skills must be available if the learning outcome is practical skills.

Teaching materials examples:

- text on Moodle
- video, games, digital material
- interactive learning material
- soft versus hard copy

- simulator
- physical objects like boats and engines, tools, equipment, model building
- model testing in tanks and laboratories

It must be clearly stated if any specific equipment, tools, or materials – such as simulation, tools, laboratories and cameras – are required for delivery.

### Assessment/exam

This is defined as evaluating the degree of acquisition of described learning outcome per the curriculum and to what extent the intended outcome is attained.

The choice of internal or external assessors must be stated.

There should be a description of how to carry out the chosen assessment method, including assessment time/duration, required resources, grade scale, preparation time, aids needed, and aids allowed.

Adequate information should be given to enable the student and assessors to understand the conditions under which the attainment of learning outcomes is demonstrated.

### 3. Evaluation

Depending on the duration of the programme, a mid-term evaluation may be considered.

Guidelines on evaluating and revising the educational packages emphasise the continuous matching of learning outcomes, teaching methods and skills needs.

See 4 On evaluation.

#### Course review

Evaluation outcomes during piloting should be fed back to the developers of the educational package.

If changes are needed or suggested after piloting, developers will be informed and consider ways to address them.

Developers should review educational packages and courses regularly, not less than every 12 months.

### 4 Acronyms

Cedefop: European Centre for the Development of Vocational Training ECVET:

European Credit System for Vocational Education and Training ECTS:

European Credit Transfer and Accumulation System

EQF: European Qualifications Framework for Lifelong Learning

ESCO: European Skills, Competences, Qualifications and Occupations ESG:

European Standards and Guidelines for quality assurance in the European Higher Education Area

NQF: National Qualifications Framework(s)

VET: Vocational Education and Training

### 5 Literature and further reading:

Biggs, J. & Tang, C. (2011): Teaching for Quality Learning at University. 4 ed. Maidenhead: Open University Press

Cedefop (2017) "Defining, writing and applying learning outcomes"

<https://www.cedefop.europa.eu/en/publications-and-resources/publications/4156> [accessed 20200120]

CEDEFOP - the European Centre for the Development of Vocational Training :  
<https://www.cedefop.europa.eu/en/about-cedefop> [accessed 20200120]

Curriculum Guidelines 4.0 – the initiative of the European Commission (DG GROW with RTD, EMPL, EAC and the EASME) on "[Skills for Industry: Curriculum Guidelines for Key Enabling Technologies and Advanced Manufacturing Technologies](https://op.europa.eu/en/publication-detail/-/publication/4dcaeee3-29c2-11e9-8d04-01aa75ed71a1/language-en/format-PDF/source-87225354)": <https://op.europa.eu/en/publication-detail/-/publication/4dcaeee3-29c2-11e9-8d04-01aa75ed71a1/language-en/format-PDF/source-87225354> [accessed 20200120]

EQF/NQF - The European Qualifications Framework:  
<https://www.cedefop.europa.eu/en/events-and-projects/projects/european-qualifications-framework-eqf>

ESCO – European Skills, Competences, Qualifications and Occupations:  
<https://ec.europa.eu/esco/portal/home> [accessed 20200120]

European Commission (2016a): Learning Opportunities and Qualifications in Europe <https://ec.europa.eu/ploteus/en/content/descriptors-page> [accessed 20200117]

European Commission (2016 b) Employment and Social Developments in Europe <https://ec.europa.eu/transparency/regdoc/rep/10102/2016/EN/SWD-2016-7- F1-EN-MAIN-PART-8.PDF> [20200119] [accessed 20200120]

SDU, (University of Southern Denmark)Center for Teaching and Learning n.d. "The VUE program" Available at <https://sduup.sdu.dk/index.php?page=start- side-en> [accessed 20200120]

<b>Curriculum</b>	
Learning objectives	
Entry requirement	
Target group	
Duration	
Assessment	
<b>Course description</b>	
Course outline	
Learning outcome	
Teaching methods	
Teaching material	
Assessment/exam	
Evaluation	
Course review	



## 1 On learning outcome

Learning outcomes should be stated in the objectives.

When the skills needs are known, the learning outcomes must be described in detail as the learning objectives of the individual lessons and tasks.

The explicit learning outcomes are the guiding tool for the teaching programme. An example of the basic structure of the learning outcomes statement may be found in the Cedefop Handbook (Cedefop 2017: 47).

The learning outcomes should be defined in terms aligned with the assessment criteria.

(Cedefop, 2017 "Defining, writing and applying learning outcomes."

<https://www.cedefop.europa.eu/en/publications-and-resources/publications/4156>)

## 2 On assessment methods

Assessment methods may be formative or summative.

Formative assessment is used during the course to gauge the student's depth or level of learning and provides the teacher with essential knowledge of the effect of their teaching methods.

Summative assessment provides proof of learning and defines the level of knowledge, skills and competence the student has attained.

Assessment can be done in various forms but is closely linked to teaching methods and learning outcomes.

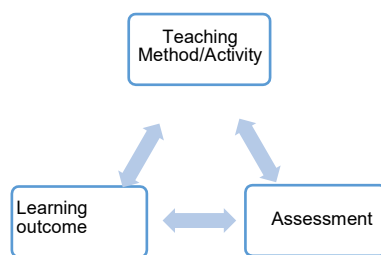


Figure 1 (Biggs and Tang 2011)

The different types of assessment make it possible to test different competencies and should be considered when choosing an assessment method. In the matrix below (Fig. 2), the learning outcomes may be entered in the columns, knowledge, skills and competence and the applicable assessment form decided.

	Knowledge	Skills	Competence
Written exams			
Oral exams			
Practical tests			
Combination			

*Figure 2 Adapted from the SDU VUE program*

Written exams such as research projects, cases and essays may be applicable to prove knowledge of theories, methods, and practice, as well as skills to apply the theories and methods on complex issues. Oral exams may show the same or, in the case of the subject being language proficiency, also demonstrate competence.

Performance-based tests such as practical exams show skills and competence in problem-solving and handling complex situations. Tests in laboratories, in practice, in simulators or in VR match learning outcomes aiming at practical skills.

Tests may be individual or group tests where the latter may prove collaborative skills and competencies.

### 3 On teaching methods

Teaching methods are described through examples from the educational packages as they were developed.

Lectures: the teacher/instructor presents a series of theories, facts, or principles, explores a problem, or explains relationships

Lectures may be given face-to-face in classrooms, online in real-time, or recorded for students to watch in their own time.

E-learning: teaching can be based in or out of classrooms, where the use of computers and the internet forms a significant component of e-learning-based teaching.

Blended learning combines online educational materials and opportunities for interaction online with traditional classroom methods.

Flipped classroom: the student studies at home – for example, watching pre-recorded lessons or instructional videos, or other videos from online web pages and completing in-class assignments or group work, in contrast to hearing lectures in class and doing homework at home.

Educational technology platforms such as Moodle, Blackboard, Canvas, Kahoot, and Padlet make learning material available on 24-hour hours.

Webinars: online lessons in which the students participate directly online rather than at a physical address. The teacher gives their presentation online via screen, and the students listen from their PC, tablet/smartphone.

Simulation exercises are a form of practice, training, monitoring or evaluation of capabilities involving the description or simulation of a scenario to which a described or simulated response is made.

Laboratory exercises involve experiments with materials or facts derived from investigations or experimentation.

Exposing students to real-life working environments by organising field trips and on-site visits or inviting industry speaker (s) to give class presentations.

Sailing time, work experience: the student works as a trainee in a shipping company or other practice-based work environment.

Student exchange: students are studying with another educational institution for a limited period of time.

AR/VR: working in virtual reality provides the possibility to place the students in a situation, places and ideas by experiencing them as if they were actually there—a digitalised environment when real life is not an option.

Interactive teaching methods promote and encourage inquisitive students more than formal lecture learning styles – research suggests minimal learning is achieved through lectures. Teaching methods must inspire, challenge, engage and encourage the application of learning.

The choice of teaching methods for each package can be justified.

The latest technology available would help to set minimum guidelines/expectations of requirements to promote consistency of delivery.

Flipped learning will be effective when supported with a follow-up activity where students can apply their learning and then debate with a tutor or peers. This

Application of Learning can then be used to monitor and review progress.

Application of all Learning is critical. This application may also include simulator activity, classroom activity and case studies. The best practice would be interaction activity.

Student exchange could result in real and positive learning experiences. Careful monitoring and review of the impact would be required.

## **Learning and teaching strategies**

### **LECTURE (large lecture theatre-style delivery)**

<b>Potential strengths of the method</b>	<b>Potential areas of weakness of method</b>
A large number of students can access the information being presented at the same time (economical method of delivery)	Minimal opportunities for students to demonstrate their learning/progress
A large amount of content can be delivered in a limited time	Minimal opportunities for students to learn collaboratively
Inspiring lecturers can motivate and enthuse students	Students are 'passive' and so tend to have limited attention spans (15-20 minutes)
Lectures are practical for students who learn by listening	Information can quickly be forgotten as there are limited opportunities to apply their learning
	Limited opportunities for differentiation, as it can be assumed that all students are at the same level of understanding

## ON-SITE CLASSROOM LEARNING

Potential strengths of the method	Potential areas of weakness of method
Opportunities for tutors and peers to learn from each other and be motivated by each other	Attendance times are set and could be restrictive due to work/life commitments.
Tutors can offer immediate guidance/advice/support to students in 'real-time'	Potential for tutor/student conflict
Assessment feedback can be provided in a timely way	Large student sizes to tutor can be detrimental to the overall effectiveness of the session
Face-to-face contact to support the building of a community of learning (and promoting employability skills)	Under-prepared tutors can deliver sessions to the majority and not sufficiently challenge the over- or under-achievers in the group.
Students are immersed in the curriculum and, with appropriate opportunities, can apply their learning.	Potential for distractions in the classroom – such as peers, displays, and mobile phones – (unless carefully managed by the tutor)
Tutors can carefully plan to ensure differentiation and students' learning needs are met and addressed	Timetabled use of inappropriate classroom environments which are not conducive to learning
Regular opportunities for formative assessment will ensure tutors are monitoring student progress.	

## COLLABORATIVE LEARNING

Potential strengths of the method	Potential areas of weakness of method
Development of employability skills (such as team-building, self-management, verbal communication, and problem-solving) alongside curriculum	Personality clashes between members of the collaborative group
The shared joy of learning, inquiry and belonging to a team	Members of the group not engaging fully and may not complete all their work, thus disadvantaging other members
Students will learn from each other.	Students learn at different speeds so collaborative learning could disadvantage some.
The tutor acts more as a facilitator of learning to support the students' exploration.	Less confident students may feel uncomfortable with collaborative learning and disengage (the responsibility of the tutor to manage to ensure that this does not happen)

Students are actively engaged with the curriculum and in their application of learning	Difficulties in marking/grading individual students
Students access higher-level order thinking skills.	

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## E-LEARNING

Potential strengths of the method	Potential areas of weakness of method
Convenience for students to access resources when it suits them and their lives/work	Weak or lack of consistent internet can affect access to resources.
Students can re-watch videos/audio repeatedly.	Difficulty in the development of practical skills
Promotes independent learning	Limited opportunity to collaborate with peers and to apply to learn
Students are encouraged to interact online, thus building a learning community in the virtual environment.	Some students may lose motivation due to a lack of face-to-face contact.
Automated marking for formative assessments can save time for the lecturer	Over-reliance on automated marking and lack of tutor feedback can impact student learning and progress
Opportunities to be creative with learning and timing of online conversations/tutorials with tutor and students (could offer evening online tutorials to suit more students' life/work balance)	A tutor is not always available when a question arises, so students can be left unable to progress until answered.

## WEBINARS

Potential strengths of the method	Potential areas of weakness of method
Accessibility to a large student base	Weak or lack of consistent internet can affect access to resources.
Can be recorded to be re-utilised/watched back by students	Involvement in webinars is timed and so may not fit with work/life pattern
Co-host facility for more than one tutor to present	Potential for technical issues/difficulties
Presentation files can be shared with students.	Students can become distracted by other things around them, such as phones/pop-ups on the screen.
	Minimal interaction between tutors and students and students to students

## AR/VR

Potential strengths of the method	Potential areas of weakness of method
Development of students' digital skills	Costs involved with the purchase of the equipment
Provides a 'safe' environment for the students to learn and apply their learning	The number of resources required to prevent long 'wait time' in sessions for all students to be able to experience and demonstrate learning in each session
Variety of skill application areas	Distraction from peer learning/social learning
Promotes initial interest and motivation – to increase student engagement	Technical issues

*Figure 3 Learning and teaching strategies*

## 4 On evaluation

The term 'evaluation' refers to assuring the quality of the educational package, its design and delivery by students and instructors (internal evaluation), with an ultimate goal of improving the course for future deliveries. The evaluation will be a survey of all students. The students will complete the survey at the end of the course. Lecturers will review the outcomes of the survey and will provide their reflections, with possible actions for developers/deliverers to consider. This information will be available for deliverers to review the package.

For example, for the evaluation form, click [here](#) link for the online version.

### **Evaluation Questionnaire (Students)**

Thank you very much for taking the time to respond to this survey.

This survey aims to collect feedback to inform the SkillSea project ([link](#)) about the potential further development of this educational package. Your responses are significant and highly appreciated as they are adding your voice to the development of this educational package.

Responding to this survey should take approximately 10 minutes, and you are free to pull out of the survey at any time.

Please note that apart from a few demographic responses, all of the questions in this survey are optional. If you cannot answer the question, leave it blank and continue the survey.

The survey is anonymous concerning individuals, and all information will be stored in a secure database and used only for this project.

On behalf of the SkillSea project, we thank you for participating in the piloting and for your responses to this survey.

- Which course did you attend?  
Green Skills 1  
Green Skills 2

Digital Skills 1  
Maritime Cybersecurity  
Leadership  
STEM  
Innovation and Intrapreneurship

2. What is the name of the organisation that provided the course?
3. What is the highest EQF level you currently hold?  
Level 3 (GSCE, high school)  
Level 4 (A-levels, vocational school)  
Level 5 (Foundation Degree, Certificate/Diploma of Higher Education)  
Level 6 (Bachelor's Degree)  
Level 7 (Master's degree, Postgraduate Certificate, Postgraduate Diploma)  
Level 8 (Doctorate, PhD)  
Not sure
4. Do you work at sea or ashore?  
Sea (please indicate the total amount of sea time in years and whether deck/engine/ETO etc.
5. Why did you choose to attend this course?
6. Please indicate your agreement/disagreement with the following statements (strongly agree to disagree strongly):  
  
The learning objectives for this course were clear to me  
The level of this course was suitable for my current academic level  
The duration of the course was appropriate  
The content of the course was relevant  
The teaching methods used in the course were engaging  
The materials provided for the course were sufficient  
The course provided opportunities for collaboration and peer-learning  
The final assessment allowed me to demonstrate my knowledge  
The course helped me improve my knowledge
7. What worked well in the course?
8. What could be further improved in this course?

Thank you very much!

**Package Review / Reflection  
(Lecturer)**

This form is developed to allow lecturers engaged in piloting educational packages to provide feedback on the Toolbox and to reflect on student feedback.



Please note that this form is not anonymous concerning individuals and organisations, as we would like to have an opportunity to reach back to you shall we need any further details surrounding your piloting experience. We are not to use information about organisations, instructors or students in any reports but utilise it to enhance the package further. All information will be stored in a secure database and used only for this project. On behalf of the SkillSea project, we thank you for participating in the piloting and for your responses to this survey.

1. Educational provider piloting the package (name, country)
2. Lecturer details:  
Name  
Position  
Email
3. Number of students at the start of the delivery
4. The number of students who completed the package
5. Did you have any dropouts?  
No  
Yes (please provide reasons for dropouts)
6. Please review the student evaluation questionnaire results and provide your reflection on their answers. Please comment on the following aspects of the delivery:  
Areas of piloting that were successful  
Areas of piloting which require improvement
7. Please provide comments towards the following components of the Toolbox. In your own words, briefly state if those sections of the Toolbox are sufficient or require further adjustments:  
  
Learning objectives  
Entry requirements  
Duration  
Course Outline  
Teaching methods  
Materials  
Assessment type  
Student engagement with the course
8. Please provide your overall feedback and recommendations

Thank you very much