

**Collection of Best Practices
in Competency Based Training and Assessment
Report
*Final***



**IWTCOMP Project
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1. Abbreviations

ADN	The European Agreement concerning the International Carriage of Dangerous Goods by Inland Waterway
EC	European Commission
EU	European Union
E&T	Education and Training
IWT	Inland Water Transport
IWTCOMP	Competency Based Inland Water Transport Education and Training
JWG	Joint Working Group
ML	Management level
OL	Operational Level
SR	Slovak Republic
RO	Romania
STCIN	Standards of Training and Certification in Inland Navigation

2. Introduction

Deckhands, boatmen and boatmasters sail all across the different European rivers and canals but have different educational backgrounds. Since the European main inland waterway networks are interconnected waterways, the different environment of education and training provided to future crew members working on inland navigation vessels may seriously impact safety on the rivers.

Where some crew members have received a mixture between practical and theoretical training, others only received theoretical training before entering the sector.

For this reason, the 96/50/EC has currently been revised and the new legal instrument entered into force recently. This implies major changes for the IWT E&T institutes which have to change their educational programmes from knowledge to competence-based education.

Within the European project PLATINA (Platform for the implementation of Naiades: www.naiades.info/platina), a 7th framework initiative by DG Move, one work package focused on "Jobs and Skills" and in particular on a strategy to harmonise inland waterway transport (IWT) education and training (E&T).

Under the roof of PLATINA, a Joint Working Group on professional competencies (JWG) consisting of participants from social partners, river commissions and inland navigation schools (EDINNA) developed a description of professional competencies based on a common understanding and harmonized system for the qualification of IWT personnel.

The STCIN (Standards of Training and Certification in Inland Navigation) allows an easier integration of career changers coming from other related transport sectors such as the maritime or fishing industry or other branches. The document describes core competences both on Operational Level (OL) and Management Level (ML).

People qualifying at any educational institute should be able to show the same level of competences. It is therefore that a common development of curricula and competence-based practices covering the professional qualification as an IWT crewmember at OL as well on ML will result in qualified crew having comparable level of knowledge, skills and attitude fit for services in the EU IWT sector.

The objective of WP3 "Best Practices in IWT education and learning" is to collect, analyse, disseminate best practices and find the best solution to implement these best practices in IWT competence-based education and training. In this research, our project partners:

- STICHTING STC-GROUP, the Netherlands
- UNIVERSITATEA DIN CRAIOVA, Romania;
- Schiffer-Berufskolleg RHEIN- Duisburg, Germany;
- ZILINSKA UNIVERZITA V ZILINE, Slovakia;
- STICHTING DUNAMARE ONDERWIJSGROEP, the Netherlands;
- CERONAV, Romania; as well as

Other institutes and training centres involved in Inland Waterway Transport (IWT) education and training and from the transport sector participated.

In order to achieve WP3 main objective, we considered and fulfilled the following activities:

- **Definition of a set of minimum criteria to prepare, execute and evaluate the best practices** based on the principle of three types of best practices (*promising education practice, validated education practice/evidence-based education practice, exemplary education practice*);
- **Collection of the best practices** by each partner;

- **Provide examples and detailed description of best practices**
- **Define gap between existing materials and materials needed** within the project

The following steps have been undertaken in the process of gathering all the best practices:

1. An **inventory of potentially relevant best practices** made by all project members in their IWT training and education premises. The inventory was done to create a gross list of potential best practices, without selecting or deleting, in order to prevent missing any potentially relevant cases.
2. **Collection of key data on each best practice.** This was done on the basis of main information aspects such as description, objective, and available data. Furthermore, an indication of a) the innovative aspects of the best practice (if any) and b) the added value of applying the best practice in a similar way in other countries was given by the partners involved.
3. **Review of the draft material** and the data additions and corrections have been made regarding criteria and best practices in order to select the best practices in IWT educations and training.
4. An **analysis** was made on the basis of the selected best practices to indicate typical trends, focus areas and lessons that can be derived from the examples of best practices given. and project partners **decided which practices could be considered as “best practices”**.

3. Competence Based Learning Environment

3.1. Defining: Competence, Competence Based education, Competence based learning, Best Practice

In order to be able to give a sound definition of **best practices** in IWT education and learning, we considered necessary to define the following terms: *competence*, *competency-based education*, *competency-based learning* in order to understand the difference between them. In this respect we presented several definitions as found in prestigious dictionaries, EU Directives and specialized literature.

Competence is a cluster of related abilities, commitments, knowledge, and skills that enable a person (or an organization) to act effectively in a job or situation. Competence indicates sufficiency of knowledge and skills that enable someone to act in a wide variety of situations. Because each level of responsibility has its own requirements, competence can occur in any period of a person's life or at any stage of his or her career¹.

‘**Competence**’ means the proven ability to use knowledge and skills required by the established standards for the proper performance of tasks necessary for the operation of inland waterway vessels²

Competence, it is argued, has to be treated as an overarching concept, signalling self-directed ability to interpret and apply knowledge, skills, attitudes and other personal and social abilities in work and study contexts. The revised EQF recommendation (Council of the European Union, 2017) defines competence as ‘the proven ability to use knowledge, skills and personal, social and/or methodological abilities, in work or study situations and in professional and personal development’ (Council of the European Union, 2017, Annex 1).

Competency based education, which focuses on the mastery of learning outcomes rather than on academic achievement through fixed time structures, is an approach that has the potential to offer trainees an efficient, less costly path to an IWT degree, employability, and enhanced professional skills.

¹ <http://www.businessdictionary.com/definition/competence.html>

² DIRECTIVE OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL on the recognition of professional qualifications in inland navigation and repealing Council Directive 96/50/EC and Council Directive 91/672/EEC, Brussels, 18.2.2016 COM(2016) 82 final

Competency based learning refers to systems of instruction, assessment, grading, and academic reporting that are based on trainees demonstrating that they have learned the knowledge and skills they are expected to learn as they progress through their education.

Note

The general goal of competency-based learning is to ensure that trainees are acquiring the knowledge and skills that are deemed to be essential to success in IWT education, careers, and adult life.

There are a lot of definitions in use to describe the concept of competences. One way we could look at it within this project would be: the ability of a trainee to act self-contained and effectively in a job or situation based on commitments, knowledge and (above all) skills. This definition sounds “digital “. That means the trainee has a competence (digit 1) or not (digit 0). A definition that sounds more analogue is mentioned In the STCIN tables. “Analogue“ means that there are different levels possible to fulfil the competence; there are different degrees of fulfilment for a competence: **“Competence”** can be considered the level of proficiency to be achieved for the proper performance of functions on board inland waterway vessel in accordance with the agreed standards or levels of knowledge, understanding and demonstrated skills.

As we would like to correspond with a definition already in use within the IW&T sector, we choose to use the following definition as given by the PLATINA Joint **Working Group** (PJWG): “The real and individual ability to apply theoretical knowledge, practical skills and attitudes subject to concrete, daily changing situations at the workplace with reference to personal and social activities³.”

As far as **Competency-based learning** is concern we will use a simplified definition:

Competency-based learning refers to systems of education that is based on trainees demonstrating their ability to act effectively in a job or situation

A **“best practice”** is commonly defined as “a technique or methodology that, through experience and research, has proven to reliably lead to a desired result⁴. A commitment to using the best practices in any field is a commitment to using all the knowledge and technology at one's disposal to ensure success. The term is used frequently in the fields of health care, government administration, the education system, project management, hardware and software product development, and elsewhere”.

In IWT education and learning, a “best practice” can be considered as a well-defined method that contributes to a successful step in achieving a competence needed in IWT.

Wikipedia defines **“best practice”** as a method or technique that has been generally accepted as superior to any alternatives because it produces results that are superior to those achieved by other means or because it has become a standard way of doing things, e.g., a standard way of complying with legal or ethical requirements

The *online Business Dictionary* defines **“best practice”** - a method or technique that has consistently shown results superior to those achieved with other means, and that is used as a benchmark.⁵

According to *Merriam Webster dictionary* a **“best practice”** is a procedure that has been shown by research and experience to produce optimal results and that is established or proposed as a standard suitable for widespread adoption⁶.

³ D3-13_Consolidated_STCIN_tables_of_competencies_26-04-2012_(final_draft).doc

⁴ <http://www.bitpipe.com/tlist/Best-Practices.html>

⁵ <http://www.businessdictionary.com/definition/best-practice.html>

⁶ <http://www.merriam-webster.com/dictionary/best%20practice>

Cambridge Dictionary states that a “**best practice**” is a working method or set of working methods that is officially accepted as being the best to use in a particular business or industry, usually described formally and in detail⁷.

To put it in a nutshell:

A “**best practice**” in IWT education and training can be defined as follows:

“Various methods and processes used to establish the extent to which a learner has achieved particular knowledge, skills, attitude (competence) confirming that certain assessed learning outcomes are achieved by the learner correspond to specific outcomes which are required for a module or qualification”.

3.2. Criteria of Best Practices in Competency Based Education in IWT

Best practices formally represent tested and proven techniques in the form of procedural documentation. They describe a set of defined methods, processes, systems or practices used by an IWT education & training institution to meet performance and efficiency standards within the IWT industry.

To ensure the quality of best practices to be selected, the following education practice steps were considered in collecting best practices in IWT education and learning:

- **Promising education practice** contains detailed information describing the practice and how to implement it. Data collection is in process, but rigorous evaluation has not yet been completed.
- **Validated education practice** is a promising education practice that has undergone rigorous evaluation documenting positive student outcomes in one education setting. The evaluation design could be experimental or quasi-experimental quantitative, qualitative, or mixed. A similar term used to describe this type of practice is evidence-based education practice.
- **Exemplary education practice** is a validated education practice successfully replicated at multiple education settings with similar positive student outcomes.

Every best practice needs to have a detailed description which includes critical elements for the implementation by providing (a) detailed description, (b) critical elements for implementation, (c) relevant educational theories and (d) essential resources and the way it has been evaluated.

And,

The following **criteria** were suggested to determine whether a practice is a “best practice” in IWT education & training:

- **Focused on the outcome:** A “Best practice” focuses on the learning outcome, in order to ensure correct application of knowledge, skills and attitude)
- **Effective and successful:** A “best practice” has proven its strategic relevance as the most effective way in achieving a specific objective; it has been successfully adopted and has had a positive impact on individuals, industry and/or communities.
- **Technically feasible:** A “best practice” is easy to deliver and to implement.

⁷ <http://dictionary.cambridge.org/dictionary/english/best-practice>

- **Inherently participatory:** Participatory approaches are essential as they support a joint sense of ownership of decisions and actions.
- **Replicable and adaptable:** A “best practice” should have the potential for replication and should therefore be adaptable to similar objectives in varying situations in IWT education and training.
- **Integrated in non-contradictory education”:** Consistency of teaching content and teaching methods with a trainer serving as a role-model and focusing on moral values (--> Gender sensitive, reducing disaster/crisis risk, protection of environment, Appreciation of human beings)

4. Collection of Best practices in IWT education and training

The purpose of IWTCOMP project is to lay the foundation for competency-based education and training for the IWT sector, to ensure that every student/trainee in the EU possesses the same competencies on operational level (OL) and management level (ML) after graduating from their study or training. To reach these goals, trainers need to be able to educate and train students in the competency-based system.

The competency-based training serves two purposes: defining minimum key competencies needed for crew members on board of IWT vessels throughout the EU, and thereby improving safety of navigation on the European interconnected waterways, and an increased level of labour mobility for crew members educated with the competencies as laid down in the new European directive.

In this respect, first, an inventory of best practices was made by each project partner in their IWT training and education premises and then they described in detail 2-3 best practices they considered useful for the key competences designated.

Before giving an overview of the best practices, we should take into account the different educational systems in Germany, Netherlands, Slovakia and Romania and ways of doing traineeships.

In Germany there is a dual system of apprenticeship. A large part of the training takes place on the vessels where trainees are working most of the time in Germany. Best practices are - during the time on board of a vessel - in the responsibility of the apprenticing company. On the other hand, the trainees are obliged to visit a vocational college. During the time at school best practices are in the responsibility of the college. Today two documents are responsible for the successful cooperation between the apprenticing company and the college:

- Rahmenlehrplan für den Ausbildungsberuf Binnenschiffer/-in, *Master plan of the apprenticeship for inland navigation operators*, 2005 and
- Verordnung über die Berufsausbildung zum Binnenschiffer/zur Binnenschifferin (BinSchAusbVo), *Regulations on vocational training for inland navigation operators*, 2005

Both documents are developed in close cooperation of both partners and regulate the objectives, content and procedures during the apprenticeship period. From these regulations the company and the college conduct the learning outputs in form of didactical curricula. The didactical curriculum of the college is competency based.

In the Netherlands the Dutch Qualification Framework is used in the secondary vocational education system. An important document in this system is the Qualification file (Kwalificatiedossier) describing the qualifications and occupational standards covering one qualification profile. It describes desirable learning outputs of VET programmes related to a specific (in our case IWT) vocation, to citizenship and further learning. This document is developed in close cooperation with the industry. This framework is competence based.

Training is done on Inland Shipping Simulator and during the internship on board.

Nowadays, in Slovakia there is not any secondary schools that prepare crew members. They used to have two schools in the 1990s, but they were closed because of lack of students (low interest of young people to study IWT). Their knowledge on best practices is from their bachelor's and master's degree.

In Romania the students get their training on board of the training vessel, an internship and during visits to different shipyards. They also work in the laboratories of the school to get practical training. They also have simulators to practice their skills.

Below we are presenting examples of best practices and their detailed description for OL and ML.

COMPETENCE: OL 1 – NAVIGATION

A. Key competences:

1.1 The boatman assists the craft's management in situations of manoeuvring and handling a craft on inland waterways, using all types of waterways and ports

C.1. Best practice example	
C.1.1. Learning	<ul style="list-style-type: none"> Classroom lessons supported by PowerPoint presentations, photos, videos; Demonstrations using ship/parts of a vessel models Practical training (exercises) on board cargo vessels
C.1.2. Assessment	<ul style="list-style-type: none"> Practical examination showing the student can apply knowledge and has the ability to execute the task correctly. Theoretical exam - computer based.



Workshop set-up in classroom



Practical exercises on a real vessel

C.2. Detailed Best practice Description	
C.2.1. Learning	<ul style="list-style-type: none"> PowerPoint and video presentations covering: <ul style="list-style-type: none"> ➤ materials available on board such as winches, bollards, ropes and wires considering relevant work safety measures including the use of personal protective and rescue equipment; ➤ communications with the wheelhouse using VHF and intercom communication systems and hand signals; ➤ the characteristics of main European inland waterways, ports and terminals; ➤ connection and disconnection of push/barge combinations using the required equipment and materials. Training (practical exercises) and practice on board cargo vessels: <ul style="list-style-type: none"> ➤ practicing berthing and departure manoeuvre; ➤ use of VHF and intercom communication systems and hand signals; ➤ convoy set up and disentanglement manoeuvre and anchor manoeuvres
C.2.2. Assessment	<ul style="list-style-type: none"> Practical examination showing the student can apply knowledge and has the ability to execute the task correctly. Theoretical exam computer based.

COMPETENCE: ML 1 – NAVIGATION

A. Key competences:

1.1 The boatmaster plans a journey and conducts navigation on inland waterways. including in situations that involve high traffic density or where other vessels carry dangerous goods, requiring basic knowledge on the European Agreement concerning the International Carriage of Dangerous Goods by Inland Waterway (ADN).

C.1. Best practice example	
C.1.1. Learning	<ul style="list-style-type: none"> Classroom lessons supported by PowerPoint presentations, photos, videos and assignments with main focus on planning a journey and conducting navigation on in a difficult situation. Practical experience (exercises) on board cargo vessels; Different tasks on board a vessel, knowledge of characteristics of a given inland waterways including locks and lifts to respecting traffic regulations, avoid damage, environment pollution, etc.
C.1.2. Assessment	<ul style="list-style-type: none"> Practical exam on board a cargo vessel. Skipper on board the vessel checks the competence according to a checklist. The student has to prove he can apply the knowledge and ability to execute correctly the task.



Instruction on board real vessel



Practical exercise in laboratory

C.2. Detailed Best practice Description	
C.2.1. Learning	<ul style="list-style-type: none"> PowerPoint and video presentations on: <ul style="list-style-type: none"> ➤ European inland waterways including locks and lifts according to navigation agreements, charts/maps, Notices to Skippers/Mariners and other publications; ➤ traffic regulations applicable to navigation on inland waterways to avoid damage (e.g. collision); ➤ environmentally sustainable and economical navigation with regard to e.g. fuel efficiency, bunkering, emission levels, shallow water effects, connection to shore electricity and waste management; ➤ traffic information tools. Assignments on working with up-to-date charts/ maps, Notices to Skippers/Mariners and other publications. Training (practical exercises) and practice on board cargo vessels: <ul style="list-style-type: none"> ➤ Navigate safely on a given short route, under certain conditions complying with all

	regulations in force.
C.2.2. Assessment	<ul style="list-style-type: none"> • Practical & theoretical exam. Checklist with different competences to check; <ul style="list-style-type: none"> ○ planning a journey and conducting navigation on the given route applying the relevant national and international regulations and using the necessary navigation aids and traffic supervision tools; ○ measures taken to avoid environmental pollution from ship; ○ record data in service record books.



Simulator training

1.2 The boatmaster sails and manoeuvres ensuring safe operation of the craft in all conditions on inland waterways

C.1. Best practice example	
C.1.1. Learning	<ul style="list-style-type: none"> • Classroom lessons supported by PowerPoint presentations, photos, videos. • Practical training (exercises) on board cargo vessels
C.1.2. Assessment	<ul style="list-style-type: none"> • Practical examination showing the student can apply knowledge and has the ability to execute the task correctly. • Theoretical exam on board cargo vessel.

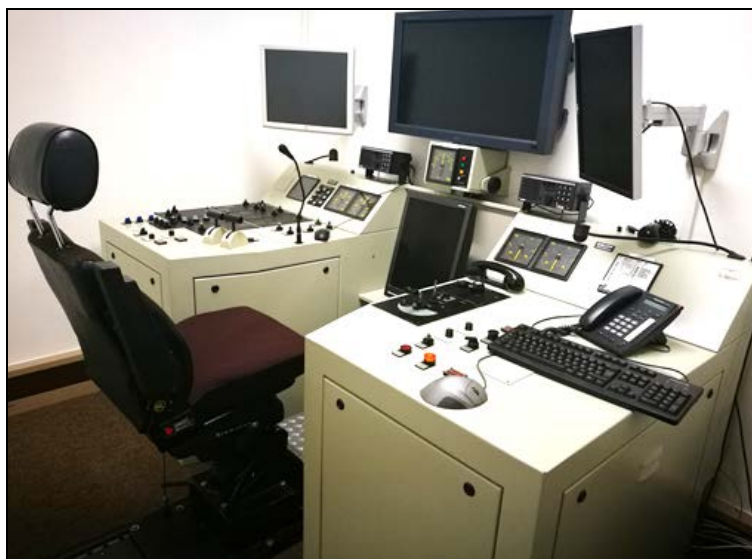
C.2. Detailed Best practice Description	
C.2.1. Learning	<ul style="list-style-type: none"> • PowerPoint and video presentations covering: <ul style="list-style-type: none"> ➤ the hydrological and morphological characteristics of the main waterways and meteorological effects on the main inland waterways; ➤ mooring and unmooring manoeuvres and towage operations. • Training (practical exercises) and practice on board cargo vessels: <ul style="list-style-type: none"> ➤ practicing sailing and manoeuvring the craft taking into account geographical, hydrological, meteorological and morphological characteristics of certain inland waterways; ➤ moor and unmoor the craft, haul towage operations, communicating with deck personnel ➤ organize safe access to craft whether sailing, moored or at anchor (use e.g. stairway, gangplank, ship's boat, fall protection and illumination); ➤ detect misrepresentation of information and apply methods of correction, initiate checks and certification procedures.
C.2.2. Assessment	<ul style="list-style-type: none"> • Checklist covering competences during practical examination on board a cargo vessel sailing on

	a short route in a certain inland waterway.
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1.3 The boatmaster responds to navigational emergencies on inland waterways

C.1. Best practice example	
C.1.1. Learning	<ul style="list-style-type: none"> • Classroom lessons supported by PowerPoint presentations, photos, videos. • Practical training (exercises) on board cargo vessels
C.1.2. Assessment	<ul style="list-style-type: none"> • Practical examination showing the student can apply knowledge and has the ability to execute the task correctly. • Computer based theoretical exam.

C.2. Detailed Best practice Description	
C.2.1. Learning	<ul style="list-style-type: none"> • PowerPoint and video presentations on: <ul style="list-style-type: none"> ➢ navigational emergencies on inland waterways; ➢ appropriate actions to take in the event of an emergency situation (beaching, collision, grounding, etc); • Training (practical exercises) and practice on board cargo vessels: <ul style="list-style-type: none"> ➢ navigate the vessel when in an unavoidable collision situation in such a way that damage will be as less as possible to cargo and persons; ➢ take appropriate actions after a collision and assess the damage and control the situation.
C.2.2. Assessment	<ul style="list-style-type: none"> • Checklist covering competences during practical examination on responding to navigational emergencies on inland waterways. • Written exam covering theory.



Bridge simulator

A. COMPETENCE: OL 2. CARGO HANDLING, STOWAGE AND PASSENGER TRANSPORT

B. Key competences:

2.1 The boatman assists the craft's management in preparation, stowage and monitoring of cargo during loading and unloading operations.

C.1. Best practice example	
C.1.1. Learning	<ul style="list-style-type: none">• Classroom lessons supported by e-learning.• Practical training on board of the training vessel (tanker push barge "Princes Amalia").• Training Oil Terminal with training vessel for 2,5 hours.• Practical training at a training station (1:1 scaled model of a tanker vessel with 3 tanks, different pump-systems, different systems of level measurement and a marine loader) at SBKR
C.1.2. Assessment	<ul style="list-style-type: none">• Practical examination showing the student can apply knowledge and has the ability to execute the task with the right attitude.• Operational Assignment about Personal Safety in case of contact with dangerous goods.• Theoretical exam computer based.



Training station (1:1 scaled model of a tanker vessel)

C.2. Detailed Best practice Description	
C.2.1. Learning	<ul style="list-style-type: none">• PowerPoint covering different tanker vessels, (un)loading, safety, cleaning the tanks and terminals.• On board of the vessel/at the training station practicing with cleaning tanks, safety, loading procedure.• E-learning 'Matroos op Koers'.
C.2.2. Assessment	<ul style="list-style-type: none">• Checklist covering competences.• Digital exam covering theory.

Loading/unloading a cargo vessel under supervision, taking safety into account.

C.1. Best practice example	
C.1.1. Learning	<ul style="list-style-type: none">• Classroom lessons supported by e-learning.• Working with lashing straps in practice setup.• Practical training on board the training vessel (cargo vessel Emeli). For example, open the

	hatches
C.1.2. Assessment	<ul style="list-style-type: none"> • Practical examination showing the student can apply knowledge and has the ability to execute the task with the right attitude. • Theoretical exam computer based.

C.2. Detailed Best practice Description	
C.2.1. Learning	<ul style="list-style-type: none"> • PowerPoint covering different tanker vessels, (un)loading, safety, and preparations. • On board of the vessel practicing with opening the hatch. • E-learning 'Matroos op Koers'.
C.2.2. Assessment	<ul style="list-style-type: none"> • Checklist covering competences. • Digital exam covering theory.



Exercises on a real vessel

C.1. Best practice example	
C.1.1. Learning	<ul style="list-style-type: none"> • Classroom lessons supported by e-learning. • Practical training on board of the training vessel (Prinses Maxima). • Practical training at a training station (1:1 scaled model of a tanker vessel)
C.1.2. Assessment	<ul style="list-style-type: none"> • Theoretical exam; • Operational assignment 'reading the gauge on board' to show the student has the right knowledge to execute the task. Graded with pass or don't pass

C.2. Detailed Best practice Description	
C.2.1. Learning	<ul style="list-style-type: none"> • On board of the vessel/at the training station practicing with reading gauge marks. • E-learning 'Matroos op Koers'.
C.2.2. Assessment	<ul style="list-style-type: none"> • Theoretical exam computer based. • Assignment for 'reading the gauge on board'.

A. COMPETENCE: ML 2. CARGO HANDLING, STOWAGE AND PASSENGER TRANSPORT

B. Key competences:

3.1 The boatmaster plans and ensures safe loading, stowage, securing, unloading; stability and care of cargoes during the voyage

Tanker Vessel

C.1. Best practice example	
C.1.1. Learning	<ul style="list-style-type: none">Classroom lessons supported by PowerPoint and assignments. The main focus is on how to compose a stowage-plan for tanker vessels.Practical experience (internship) on board of a tanker vessel. Different tasks on board of a tanker vessel from preparations, to loading/unloading, keeping watch and administration
C.1.2. Assessment	<ul style="list-style-type: none">A general test about stability (multiple choice) and a test where the student has to fill in a stowage plan.Practical exam on board learning vessel. Skipper on board the vessel checks the competence. The student has to proof he can apply the knowledge and ability to execute the task with the right attitude. The Skipper on board the learning vessel checks the competences of the student according to a checklist.

C.2. Detailed Best practice Description	
C.2.1. Learning	<p>Classroom:</p> <ul style="list-style-type: none">Different PowerPoints teacher uses in the classroom and student can find himself online;Different assignments about stowage from easy to more complex loading assignment;Empty stowage plan;Information about tonnage certificate;Table and tonnage certificate <p>On board:</p> <ul style="list-style-type: none">Practice record book (assignments during the internship).
C.2.2. Assessment	<ul style="list-style-type: none">Practical exam. Checklist for the skipper with different competences to check:<ul style="list-style-type: none">○ preparations;○ loading/unloading;○ keeping watch.Theoretical test to proof the student has the knowledge belonging to the competences.



Exercises on a real vessel

C.1. Best practice example	
C.1.1. Learning	<ul style="list-style-type: none"> Classroom lessons supported by PowerPoint and assignments. The student starts in the first year with basic information about containers and sailing. In the assignments later on the students has to make a stowage plan and calculate the stability of container vessels. Practical experience on board container vessel. Different tasks on board container vessel from preparations, to loading/unloading, keeping watch and administration
C.1.2. Assessment	<ul style="list-style-type: none"> A general test about stability (multiple choice) and a test where the student has to fill in a stowage plan and calculate stability. And take in to account the height of the vessel and bridges and draft of the vessel. Practical exam on board learning vessel. Skipper on board the vessel checks the competence. The student has to proof he can apply the knowledge and ability to execute the task with the right attitude. The Skipper on board the learning vessel checks the competences of the student according to a checklist.

C.2. Detailed Best practice Description	
C.2.1. Learning	<p>Classroom:</p> <ul style="list-style-type: none"> Different PowerPoints teacher uses in the classroom and student can find himself online; Different assignments about stowage from easy to more complex loading assignment; Empty stowage plan; Information about tonnage certificate; Table and tonnage certificate <p>On board:</p> <ul style="list-style-type: none"> Practice record book (assignments during the internship).
C.2.2. Assessment	<ul style="list-style-type: none"> Practical exam. Checklist for the skipper with different competences to check: <ul style="list-style-type: none"> ➤ preparations; ➤ loading/unloading; ➤ keeping watch. Theoretical test to proof the student has the knowledge belonging to the competences.



Exercises in Computer Practica

COMPETENCE: OL 3 - CONTROLLING THE OPERATION OF THE CRAFT

A. Key competences:

3.1 The boatman assists the craft's management in controlling the operation of the craft and care for persons on board

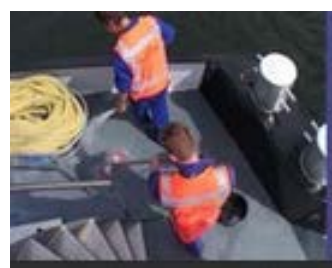
C.1. Best practice example	
C.1.1. Learning	<ul style="list-style-type: none">• By means of practical exercises the students apply their knowledge in practical oriented situations• Students apply their knowledge and skills by assisting onboard training vessel
C.1.2. Assessment	<ul style="list-style-type: none">• Assessment of knowledge by means of written exam• Assessment of skills onboard training vessel by means of a practical test called "Proof of Competence"

C.2. Detailed Best practice Description	
C.2.1. Learning	Example practical exercise: <ul style="list-style-type: none">• Draw the inland shipping vessel and show the different parts of the vessel and describe the function of each part.
C.2.2. Assessment	<ul style="list-style-type: none">• The proof of competence is on board a training vessel and each student is assessed according to the specific competences. All scores are determined and described with the use of assessment forms. This is part of the quality and assurance system of the exams.

3.2 The boatman uses the craft's equipment

C.1. Best practice example	
C.1.1. Learning	<ul style="list-style-type: none">• Knowledge elements will be explained during classroom lessons;• Practicing the use of deck equipment, anchor and winches, etc onboard real training vessel.
C.1.2. Assessment	<ul style="list-style-type: none">• Assessment of knowledge by means of written exam• Assessment of skills onboard training vessel by means of a practical test called "Proof of Competence"

C.2. Detailed Best practice Description	
C.2.1. Learning	<ul style="list-style-type: none">• Powerpoint presentations, video's and real equipment are used to support the transfer of knowledge to the students.
C.2.2. Assessment	<ul style="list-style-type: none">• The proof of competence is on board a training vessel and each student is assessed according to the specific competences. All scores are determined and described with the use of assessment forms. This is part of the quality and assurance system of the exams.



Practical exercises on board real vessel

1.6 werkproces: Ankert het binnenvaartschip.

Omschrijving (toelichting)

De schipper binnenvaart werkt bij het ankeren veilig op het voorschip of achterschip en handelt op aanwijzingen van en in afstemming met de roerganger. Hij laat het anker vallen/haalt het anker op en controleert of het anker houdt. De schipper binnenvaart plaatst daarbij de optische tekens conform de reglementen.

Gewenst resultaat:

Het binnenvaartschip is veilig, zonder schade en op betrouwbare wijze geankerd.

competentie		Onvoldoende	Matig	Voldoende	Goed
	De schipper binnenvaart:				
E	Stemt het ankeren af met de roerganger en waarschuwt tijdig bij onveilige situaties zodat het binnenvaartschip zonder schade en op betrouwbare wijze geankerd is.				
K	Laat rustig en veilig op het juiste moment en de juiste positie het anker vallen/haalt het anker op en controleert het resultaat zodat (persoonlijke) ongelukken worden voorkomen en het schip op een juiste en veilige manier geankerd is.				
T	Werkt op aanwijzingen van de roerganger, gebruikt persoonlijke beschermings- en reddingsmiddelen en de voorgeschreven uitrustings- en hulpstukken zodat het schip op betrouwbare en veilige wijze voor/van anker gaat en handelt conform de (veiligheids)voorschriften van het bedrijf, die van derden en de (inter)nationale wetgeving op het gebied van binnenvaart, veiligheid, milieu en arbeids-omstandigheden zodat de (veiligheids)risico's voor de bemanning, het schip en de nautische omgeving geminimaliseerd worden.				
V	Blijft ook onder tijdsdruk of moeilijke nautische omstandigheden rustig zodat hij niet in paniek raakt en adequaat kan handelen.				
	Totaal (in te vullen door de school)				
	Onvoldoende = 0 punten Matig = 1 punt Voldoende = 2 punten Goed = 3 punten				
	Cesuur: bij 8 punten of meer is de leerling geslaagd.				

Example assessment form (in Dutch): Anchoring the vessel

A. COMPETENCE: ML 3 - CONTROLLING THE OPERATION OF THE CRAFT

B. Key competences:

3.1 Building, construction and operation of various types of craft

C.1. Best practice example	
C.1.1. Learning	<ul style="list-style-type: none">• Knowledge regarding the construction of the various types of vessels will be explained by means of theoretical lessons;• Knowledge transfer with use of real-life examples on board training vessels and during intern ship
C.1.2. Assessment	<ul style="list-style-type: none">• Assessment by means of theory tests;• Assessment of the operation of the vessel is an integral part of the assessment on board during internships.

C.2. Detailed Best practice Description	
C.2.1. Learning	<ul style="list-style-type: none">• Powerpoint presentations, video's and real equipment are used to support the transfer of knowledge to the students.
C.2.2. Assessment	<ul style="list-style-type: none">• Assessment of skills onboard training vessel by means of a practical test called "Proof of Competence".

3.2 The boatmaster controls and monitors the mandatory equipment as mentioned in the applicable craft certificate


C.1. Best practice example	
C.1.1. Learning	<ul style="list-style-type: none">• Procedures of monitoring and control will be explained during classroom lessons;• Controlling the use of mandatory equipment of the training vessel.
C.1.2. Assessment	<ul style="list-style-type: none">• Written tests will be used to assess the knowledge of the students;• Assessment of controlling and monitoring skills onboard training vessel by means of a "Proof of Competence".

C.2. Detailed Best practice Description	
C.2.1. Learning	<ul style="list-style-type: none">• Powerpoint presentations, video's and real equipment are used to support the transfer of knowledge to the students.
C.2.2. Assessment	<ul style="list-style-type: none">• The knowledge, skills and attitude of the students are assessed by means of a proof of competence on board a training vessel. Students are assessed according to the specific competences in the competence plan. All scores are determined and described with the use of assessment forms. This is part of the quality and assurance system of the exams.

A. COMPETENCE: OL 4 - MARINE ENGINEERING AND ELECTRICAL, ELECTRONIC AND CONTROL ENGINEERING**B. Key competences:****4.1 The boatman assists the craft's management in marine-, electrical-, electronic-, control engineering to ensure general technical safety.**

C.1. Best practice example	
C.1.1. Learning	<p>Theoretical:</p> <ul style="list-style-type: none">• Classroom lessons/teaching supported by e-learning <p>Practical:</p> <ul style="list-style-type: none">• Practicing different starting systems according to instructions on board the training vessel "Apolodor";• Practicing different starting systems according to instructions at different training stations in the engine laboratory;• Practicing preparing, starting, connecting and changing generators;• Practicing preparing, starting, connecting and changing generators at different training stations in the engine laboratory.
C.1.2. Assessment	<ul style="list-style-type: none">• Practical examination: showing he can apply the knowledge, ability to execute the task with the right attitude

C.2. Detailed Best practice Description	
C.2.1. Learning	<p>Theoretical:</p> <ul style="list-style-type: none">• Teaching using verbal communication, beamer, smart board, laptop, different footage, animations. <p>Practical:</p> <ul style="list-style-type: none">• During laboratory classes the students go onboard of the school ship and under surveillance they do the following steps:<ul style="list-style-type: none">➤ starting the boiling systems up to 70°C;➤ starting the recirculating pump in order to preheat the main engine;➤ simultaneously they start charging the batteries;➤ starting the engine and monitoring electrical-, electronic-, control engineering devices.➤ opening the cooling system of the main engine and shutting down the boiling system when the temperature reaches the specified value'.
C.2.2. Assessment	<p>Theoretical assessment:</p> <ul style="list-style-type: none">➤ Multiple choice tests. <p>Practical assessment:</p> <ul style="list-style-type: none">➤ Each student is assessed during the laboratory classes on board of the training vessel;

MTU Vorbereiten und Starten 	
Vorbereiten	<div> <div>Kraftstoffaufbereitung</div> <div> <div>Prüfen der Stellungen der Armaturen</div> <div>Prüfen Flüssigkeitsaustritt</div> <div>Einschalten von Steuerung und Motoren</div> </div> </div> <div> <div>Motor</div> <div> <div>Ölstandskontrolle</div> <div>Leichtgängigkeit der Luftklappen</div> <div>Kontrolle Flüssigkeitsaustritt</div> <div>Kontrolle fester Sitz aller Teile</div> <div>Kontrollbohrung Hochdruckpumpe</div> <div>Kontrolle Luftfilter</div> <div>Stellung der Kraftstoffhähne</div> <div>Flüssigkeitsansammlung unter dem Motor</div> <div>A-Seite</div> <div> <div>Kontrollbohrungen der Wasserpumpen</div> <div>Kontrolle Flüssigkeitsaustritt</div> <div>Kontrolle fester Sitz aller Teile</div> <div>Kontrolle Luftfilter</div> </div> <div>B-Seite</div> </div> </div> <div> <div>Wasserversorgung</div> <div> <div>Seeschieber</div> <div>Wasserstand</div> <div>Einschalten</div> </div> </div> <div> <div>Motorensteuerung</div> <div> <div>Fehlermeldungen <div>aktuell</div> <div>Fehlerringspeicher</div></div> <div>Prüfen der Messwerte</div> <div>Lampentest</div> <div>Prüfen der NOT-AUS-Funktion</div> <div>wechsel in Bedienoberfläche</div> <div>"ready for operation" bestätigen</div> </div> </div>
Starten	<div> <div>"local operation" einschalten</div> <div>Kontrolle</div> <div> <div>Öldruck</div> <div>Wasseraustritt</div> <div>Geräusche</div> <div>nicht erwünschter Flüssigkeitsaustritt</div> <div>Fehlermeldungen</div> </div> <div>Übergabe ans Steuerhaus</div> </div>

Checklist (in German): Preparing an MTU-Engine before starting the engine

**Checkliste zum Motorstart der MTU 8V4000**

	Tätigkeiten
1	Prüfung der Kraftstoffaufbereitungsanlage
1.1	Kraftstoffaufbereitungsanlage einschalten, gegebenenfalls Sicherungen kontrollieren
1.2	Prüfen der Stellungen der Armaturen
2	Prüfung der Motoranlage
2.1	Hauptschalter des Motors einschalten
2.2	Vorwärmung taktil prüfen
2.3	Motorölstand prüfen
2.4	Dichtheit und allgemeiner Zustand des Motors auf der „A-Seite“ visuell prüfen
2.5	Leichtgängigkeit der Zuluft- und Abluftdrosselklappen prüfen
2.6	Kraftstoffhähne gegebenenfalls öffnen
2.7	Kontrollbohrung der Kraftstoffhochdruckpumpe prüfen
2.8	Entlastungsbohrung beider Wasserpumpen prüfen
2.9	Kühlwasserstand im Ausgleichsbehälter prüfen
2.10	Dichtheit und allgemeinen Zustand des Motors auf der „B-Seite“ visuell prüfen
2.11	Seeschieber öffnen
3	Prüfung am Motorregler
3.1	Signale am Local Operationpanel Panel (LOP) prüfen Engine Control Unit (ECU): Temperaturen, Drücke, Drehfrequenzen, Fehlerringspeicher einsehen
3.2	Lampentest durchführen
3.3	Not-Aus Funktion durch Betätigen testen und anschließend die Meldung quittieren.
3.4	Geeignete Bedienoberfläche wählen
4	Motor starten
4.1	Button „READY FOR OPERATION“ betätigen
4.2	Button „LOCAL OPERATION“ betätigen, um den örtlichen Betrieb einzuschalten
4.3	Button „START“ betätigen
4.4	Messwerte am Wachstand (LOP) beobachten, besonders die der Öl- und Kraftstoffdrücke
4.5	Aktivzustand der Pumpe der Kraftstoffaufbereitungsanlage feststellen
4.6	Motor auf besondere Geräusche und Austritt von Flüssigkeiten und Gasen durch einen Rundgang überprüfen
4.7	Motor an das Steuerhaus übergeben (Button „LOCAL OPERATION“ betätigen um auf Fernbedienung umzuschalten)

Checklist (in German): Starting an MTU 8V4000 engine

4.2 The boatman performs maintenance work on marine-, electrical-, electronic-, control engineering equipment to ensure general technical safety

C.1. Best practice example	
C.1.1. Learning	<p>Theoretical:</p> <ul style="list-style-type: none"> • Classroom lessons/teaching supported by e-learning <p>Practical:</p> <ul style="list-style-type: none"> ➤ Practicing for understanding technical information material and documenting technical procedures on board of the training vessel Apolodor ; ➤ Practicing for understanding technical information material and documenting technical procedures at different training stations in the engine laboratory ➤ Practicing for understanding the qualities and limits of different materials used on board to maintain and repair equipment and technical devices.
C.1.2. Assessment	<ul style="list-style-type: none"> • Practical examination: showing he can apply the knowledge, ability to execute the task with the right attitude

C.2. Detailed Best practice Description	
C.2.1. Learning	<p>Theoretical:</p> <ul style="list-style-type: none"> • Teaching using verbal communication, beamer, smart board, laptop, different footage, animations. <p>Practical:</p> <ul style="list-style-type: none"> • During laboratory classes the students go onboard of the school ship and under surveillance they do the following steps: <ul style="list-style-type: none"> ➤ the students learn about the technical specs of the training vessel Apolodor through reading the manuals, procedures, instructions and technical specs provided by owners; ➤ they perform a visual identification of the marine-, electrical-, electronic-, control engineering equipment existing on board of training vessel Apolodor; ➤ they apply the technical procedures and instructions in order to develop maintenance operations to ensure general technical safety. • During laboratory classes the students go onboard of the training vessel and under surveillance they do the following steps: <ul style="list-style-type: none"> ➤ the students learn to identify the spare parts of electrical, electronic and mechanical devices; ➤ the students follow the technical procedures regarding the replacement of different spare parts of the devices taking into account the limits and the characteristics required by the maintenance instructions.
C.2.2. Assessment	<p>Theoretical assessment:</p> <ul style="list-style-type: none"> ➤ Multiple choice tests. <p>Practical assessment:</p> <ul style="list-style-type: none"> ➤ Each student is assessed during the laboratory classes on board of the training vessel;

A. COMPETENCE: ML 4 - MARINE ENGINEERING AND ELECTRICAL, ELECTRONIC AND CONTROL ENGINEERING

B. Key competences:

4.1 The boatmaster plans the workflow of marine engineering and electrical, electronic and control engineering

C.1. Best practice example	
C.1.1. Learning	<p>Theoretical:</p> <ul style="list-style-type: none"> Classroom lessons/teaching supported by e-learning <p>Practical:</p> <ul style="list-style-type: none"> ➤ Practicing in order to gain technical knowledge of the functionality of the main engines and auxiliary equipment and their control systems.
C.1.2. Assessment	<ul style="list-style-type: none"> Practical examination: showing he can apply the knowledge, ability to execute the task with the right attitude

C.2. Detailed Best practice Description	
C.2.1. Learning	<p>Theoretical:</p> <ul style="list-style-type: none"> Teaching using verbal communication, beamer, smart board, laptop, different footage, animations. <p>Practical:</p> <ul style="list-style-type: none"> During laboratory classes the students go onboard of the school ship and under surveillance they do the following steps: <ul style="list-style-type: none"> ➤ The students monitor different operating regimes of the main and auxiliary engines on board of training vessel Apolodor in order to obtain optimal energy efficiency of the main and auxiliary engines. ➤ Practicing on telegraph remote controllers of the main engines as follows: <ul style="list-style-type: none"> ➤ Passing from <i>full speed ahead</i> to <i>full speed astern</i>: the operation is performed by passing through neutral position of the telegraph remote controller: <ul style="list-style-type: none"> - In normal conditions the passing through neutral position is performed waiting on neutral position the reduction of engine rotation up to the connecting rotation speed of the gear unit. - In extreme (dangerous) conditions passing through the neutral position should be possible without any delays. ➤ Simultaneously use of the propulsion and steering systems will be performed in two different ways: <ul style="list-style-type: none"> - Port maneuvering regime, when large angles of steering gear are used and the propulsion system is coupled alternatively ahead/ astern. - Navigation regime, when small angles of steering gear are used and the engines work in normal operating regimes.
C.2.2. Assessment	<ul style="list-style-type: none"> Practical examination: showing he can apply the knowledge, ability to execute the task with the right attitude Each student is assessed during the laboratory classes on board of the training vessel;

4.2 The boatmaster monitors main engines and auxiliary machinery and equipment

C.1. Best practice example	
C.1.1. Learning	<p>Theoretical:</p> <ul style="list-style-type: none">• Classroom lessons/teaching supported by e-learning <p>Practical:</p> <ul style="list-style-type: none">➤ Practicing in order to set-up and monitor procedure to properly use of main engines.
C.1.2. Assessment	<ul style="list-style-type: none">• Practical examination: showing he can apply the knowledge, ability to execute the task with the right attitude

C.2. Detailed Best practice Description	
C.2.1. Learning	<p>Theoretical:</p> <ul style="list-style-type: none">• Teaching using verbal communication, beamer, smart board, laptop, different footage, animations. <p>Practical:</p> <ul style="list-style-type: none">• During laboratory classes the students go onboard of the school ship and under surveillance they do the following steps:<ul style="list-style-type: none">➤ The students learn to monitor the crew members following the starting procedure of the main engine (oil pressure, starting up temperature, cooling circuit, start-up batteries, checking gear coupling, fuelling circuit);➤ the students learn to monitor the crew members following the shutting down procedure of the main engine (fuelling circuit, putting in idle regime before stopping the engines).
C.2.2. Assessment	<ul style="list-style-type: none">• Practical examination: showing he can apply the knowledge, ability to execute the task with the right attitude

4.3 The boatmaster plans and gives instructions in relation to the craft's pump and pump control system – NA in our training facilities.



Engine room simulator

4.4 The boatmaster organises safe use and application, maintenance and repair of the craft's electro-technical devices

C.1. Best practice example	
C.1.1. Learning	<p>Theoretical:</p> <ul style="list-style-type: none"> Classroom lessons/teaching supported by e-learning <p>Practical:</p> <ul style="list-style-type: none"> Practicing to organize and give instructions to crew members in the pre- and after activities to connect or disconnect technical shore-based facilities.
C.1.2. Assessment	<ul style="list-style-type: none"> Practical examination: showing he can apply the knowledge, ability to execute the task with the right attitude

C.2. Detailed Best practice Description	
C.2.1. Learning	<p>Theoretical:</p> <ul style="list-style-type: none"> Teaching using verbal communication, beamer, smart board, laptop, different footage, animations. <p>Practical:</p> <ul style="list-style-type: none"> During laboratory classes the students go onboard of the school ship and under surveillance they do the following steps: <ul style="list-style-type: none"> ➤ The students learn the procedure to connect to the technical shore-based facilities: <ul style="list-style-type: none"> shutting down all electrical, electronic devices related to the vessel operation during navigation; disconnecting the generators from the electrical system; connecting the electrical system of the vessels to the technical shore facilities ➤ The students learn to monitor the crew members following the shutting down procedure of the main engine (fuelling circuit, putting in idle regime before stopping the engines). ➤ The students learn the procedure to disconnect from the technical shore based facilities: <ul style="list-style-type: none"> starting the generators and bringing them to the nominal operating mode; disconnecting the vessel electrical system from the technical shore-based facilities; connecting the generators to the vessel's electrical system
C.2.2. Assessment	<ul style="list-style-type: none"> Practical examination: showing he can apply the knowledge, ability to execute the task with the right attitude

4.5 The boatmaster controls the safe maintenance and repair of technical devices

C.1. Best practice example	
C.1.1. Learning	<p>Theoretical:</p> <ul style="list-style-type: none">• Classroom lessons/teaching supported by e-learning describing the electrical panel with fuses and relays <p>Practical:</p> <ul style="list-style-type: none">• Practicing to assess characteristics and limits of materials as well as necessary procedures which are used to maintain and repair technical devices.
C.1.2. Assessment	<ul style="list-style-type: none">• Practical examination: showing he can apply the knowledge, ability to execute the task with the right attitude

C.2. Detailed Best practice Description	
C.2.1. Learning	<p>Theoretical:</p> <ul style="list-style-type: none">• Teaching using verbal communication, beamer, smart board, laptop, different footage, animations. <p>Practical:</p> <ul style="list-style-type: none">• During laboratory classes the students go onboard of the school ship and under surveillance they do the following steps:<ul style="list-style-type: none">➤ The students acquire knowledge from technical manuals of the vessel in terms of electrical, hydraulic, mechanical systems:➤ The students learn how to coordinate the safe maintenance activity on board of the ship
C.2.2. Assessment	<ul style="list-style-type: none">• Practical examination: showing he can apply the knowledge, ability to execute the task with the right attitude

A. COMPETENCE: OL 5 - MAINTENANCE AND REPAIR

B. Key competences:

5.1. The boatman learns how to maintenance and repair of inland water transport vessels and their devices, that is he learns the latest knowledge about vessel diagnostics and its devices.

C.1. Best practice example	
C.1.1. Learning	<ul style="list-style-type: none">• Diagnosis and repair of stationary and moving parts of an engine, electrical machines and devices, propellers and turbines.• The classroom lessons that are supported by e-learning materials, textbooks and videos;• The practical training on board of the push boat or the motor cargo vessel within the summer training in the cooperation with Slovak Shipping and Ports, the biggest carrier in IWT in SVK.• Practical training at different training stations (engines, rudder systems) in the engine laboratory at SBKR
C.1.2. Assessment	<ul style="list-style-type: none">• Practical examination: showing he can apply the knowledge, ability to execute the task with the right attitude• Operational assignment about maintenance and repair of vessels in case of damage of the vessel or its devices;• Theoretical exam.



Rudder system to understand the function and to train maintenance tasks

C.2. Detailed Best practice Description	
C.2.1. Learning	<ul style="list-style-type: none">• Power Point that covers different types of diagnostics and repair of stationary and moving parts of an engine, electrical machines and devices, propellers and turbines of the vessel;• Diagnostic and repair procedures and technologies that are used for the maintenance and repair of devices of vessels.
C.2.2. Assessment	<ul style="list-style-type: none">• Checklist that covers the types of diagnostics and repair of stationary and moving parts of an engine, electrical machines and devices of the vessels, and propellers and turbines of the vessel;• Oral exam that covers the theory.• The exam has got written form (test with multiple choices) and oral form (answers for the questions).



*Maintenance training station:
Changing a filter*



*MTU Training station: Looking for a malfunction
at the engine control equipment*

COMPETENCE: ML 5 - MAINTENANCE AND REPAIR

A. Key competences:

5.1. The boatmaster assists the vessel's management during maintenance and repair of inland water transport vessels and their devices, he learns which management techniques and procedures are used during vessel diagnostics and its devices.

Management techniques used during damage of machines, mechanisms and vessel structures, the basic diagnostic and repair procedures and technologies.

C.1. Best practice example	
C.1.1. Learning	<ul style="list-style-type: none"> • The classroom lessons that are supported by e-learning materials, textbooks and videos; • The practical training on board of the push boat or the motor cargo vessel within the summer training in the cooperation with Slovak Shipping and Ports, the biggest carrier in IWT in SVK; • He learns how to work the vessel's management and their techniques, how to respect their rules and orders.
C.1.2. Assessment	<ul style="list-style-type: none"> • Practical examination that shows that the student can apply knowledge and has the ability to execute the task with the right attitude; • Management assignment about maintenance and repair of vessels in case of damage of the vessel or its devices; • Theoretical exam.

C.2. Detailed Best practice Description	
C.2.1. Learning	<ul style="list-style-type: none"> • PowerPoint that covers different types of management techniques that are used by vessel's management in the case of damage of machines, mechanisms and vessel structures, and the diagnostic and repair procedures and technologies.
C.2.2. Assessment	<ul style="list-style-type: none"> • Checklist that covers the management techniques types of damage of machines, mechanisms and vessel structures, the procedures of diagnostics and repair of vessels; • Oral exam that covers the theory.

Management techniques used during diagnosis and repair of stationary and moving parts of an engine, electrical machines and devices, propellers and turbines.

C.1. Best practice example	
C.1.1. Learning	<ul style="list-style-type: none"> • The classroom lessons that are supported by e-learning materials, textbooks and videos; • The practical training on board of the push boat or the motor cargo vessel within the summer training in the cooperation with Slovak Shipping and Ports, the biggest carrier in IWT in SVK; • He learns how to work the vessel's management, how to respect their rules and orders.
C.1.2. Assessment	<ul style="list-style-type: none"> • Practical examination that shows that the student can apply knowledge and has the ability to execute the task with the right attitude; • Management assignment about diagnostics and repair of stationary and moving parts of an engine, electrical machines and devices, propellers and turbines of the vessel; • Theoretical exam.

C.2. Detailed Best practice Description	
C.2.1. Learning	<ul style="list-style-type: none"> • PowerPoint that covers management techniques that are used during diagnostics and repair of stationary and moving parts of an engine, electrical machines and devices, propellers and turbines of the vessel; • Diagnostic and repair procedures and technologies that are used for the maintenance and repair of devices of vessels.
C.2.2. Assessment	<ul style="list-style-type: none"> • Checklist that covers management techniques used during diagnostics and repair of stationary and moving parts of an engine, electrical machines and devices of the vessels, and propellers and turbines of the vessel; • Oral exam that covers the theory

A. COMPETENCE: OL 6 – COMMUNICATION

B. Key competences:

6.1 The boatman performs general and professional communication.

Use information and communication systems including the use of standardized communication phrases (Knowledge and ability to use the VHF equipment)

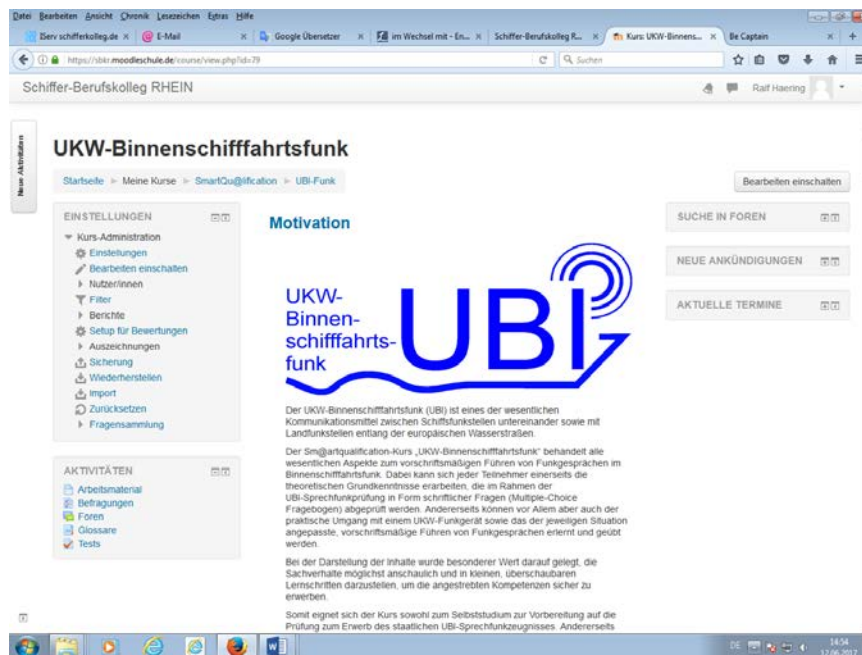
C.1. Best practice example	
C.1.1. Learning	<ul style="list-style-type: none"> Classroom lessons/teaching supported by e-learning, e.g. regulations, introducing communication phrases etc.; Practicing radio communication with real VHF-devices in a training room/in a simulator; E-learning module for training examination questions and for preparing the VHF-device as well as for training communication phrases.
C.1.2. Assessment	<ul style="list-style-type: none"> Written tests, e-learning based tests; Practical examination showing that the trainee can apply the knowledge in different situations, is able to operate the VHF-device and to communicate according to the rules and use the correct phrases.



VHF-lab with training stations




Simulator Bridge with VHF-devices
(blue boxes)



Screenshot E-Learning System VHF radio communication (in German)

C.2. Detailed Best practice Description

C.2.1. Learning	<ul style="list-style-type: none"> The theoretical basics of VHF communication is taught separately from the practical exercises. In the theoretical lessons the basic knowledge of VHF communication is taught in the form of individual, partner or group work (with the help of worksheets), interactive teacher-student talk or lectures. An e-learning system can also be used by the trainees and trainers. In this stage of learning the trainees have to adapt the rules from the relevant documents. During the teaching hours in the VHF-lab this knowledge is applied directly. For this purpose, the VHF-lab is equipped with approximately ten standard VHF radio devices from various manufacturers (training stations). Thus, for example, directly spoken speech texts can be recorded or the use of the international spelling tablet can be practiced practically. In addition, for example, the standard communication phrases are taught in the English or Dutch lessons. Later, the application of the knowledge is repeated during the nautical instructions in the SANDRA inland navigation simulator as well as in USAR-lessons. There communication can be applied in real sailing situations in order to give the trainees a high degree of security in the handling of VHF communication.
C.2.2. Assessment	<ul style="list-style-type: none"> The evaluation of the learning outcome and the acquisition of competences takes place at different levels: In addition to oral examinations at the beginning of individual lessons, written tests will be done in preparation for the state examination. These written tests consist of multiple choice as well as open questions. In addition, action-oriented workflows are to be processed practically based on situation-specific operations (Example: Searching for a radio channel from the manual for inland waterway transport.) The setting and operation of the radio are checked on real radio equipment according to checklists.




Schiffer-
Berufskolleg
RHEIN

Arbeitsblatt

Bedienelemente eines Funkgeräts

1. Bezeichnen Sie die Bedienelemente des abgebildeten Funkgeräts. Geben Sie in Klammern auch andere alternative Bezeichnungen einzelner Bedienelemente an (z. B. Power (Ein/Aus, On/Off)).



2. Geben Sie in Stichworten die Vorgehensweise bei der Inbetriebnahme des Funkgeräts an (bis zu dem Zeitpunkt, zu dem Sie die Sprechaste zur Abgabe des Funkgesprächs drücken).

Example of a worksheet (in German)

Funkübung...Situation 1.03



Sie fahren mit Motorschiff Adelheit W. bei Düsseldorf-Oberkassel zu Berg und sollen am nächsten Tag im Neußer Hafen löschen. Sie melden sich beim Hafenmeister, damit er ihnen einen Liegeplatz zuweist.



Kanal: Funkspruch:



Description of a situation: Operate the VHF-device and talk to the port authority (in German)

Solve different tasks with the help of digital devices AIS and RIS (Ability to use Inland AIS including data handling)

C.1. Best practice example	
C.1.1. Learning	<ul style="list-style-type: none"> Classroom lessons, e.g. regulations, knowledge of operating principles, operating menu structure, available Information etc.; Practicing use of real AIS/RIS in a simulator (Radarplot 720°, Simulator of Advanced Inland-Navigation Duisburg – SANDRA)..
C.1.2. Assessment	<ul style="list-style-type: none"> Written tests, oral presentations; Practical examination showing that the trainee can apply the knowledge in different situations, is able to operate the AIS/RIS, to get information of other vessels and to enter data, e.g. travelling data.



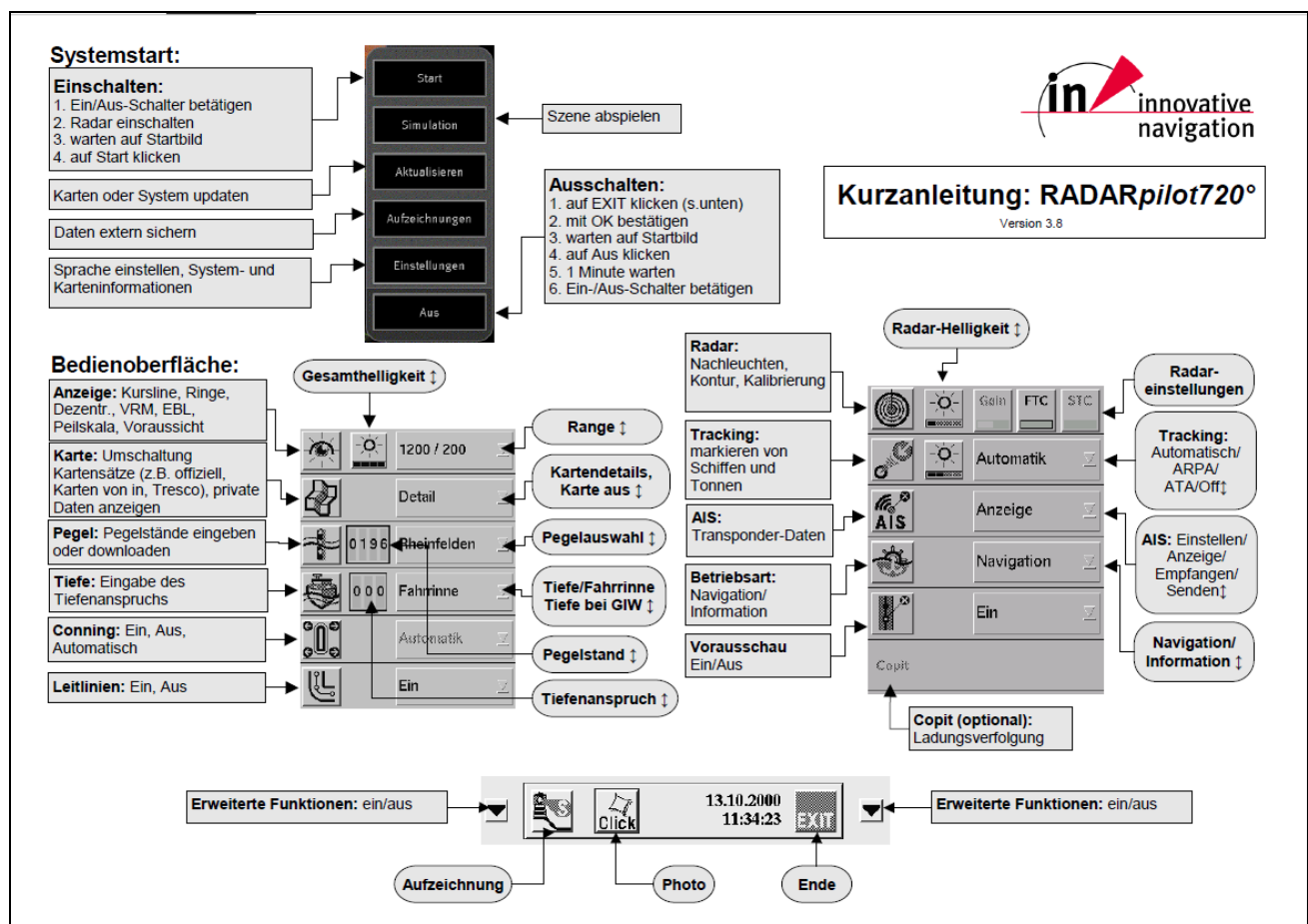
Radarplot 720° with AIS/RIS



Simulator Bridge with AIS/RIS (monitor on the right side)

C.2. Detailed Best practice Description	
C.2.1. Learning	<p>The theoretical basics of AIS/RIS is taught alternating with the practical exercises. In the theoretical learning phases the basic knowledge of AIS principles, the design of a AIS and the different functions is taught in the form of individual, partner or group work (with the help of worksheets), interactive teacher-student talk or lectures. Normally the official papers of the authority about Inland AIS and the manual of the system deliverer are used to get information of these aspects. In this stage of learning, the trainees have to adapt the rules from the relevant documents.</p> <p>During the teaching phases with the Radarplot 720° (Innovative Navigation), which has integrated an AIS (in combination with VHF-radio) this knowledge is applied directly. For this purpose, the Inland Navigation Simulator SANDRA is used, where all five bridges are equipped with a Radarplot 720°. Thus, for example, the input of travelling data, sending of messages, receiving of messages, getting information of other vessels can be practiced practically under supervision of the trainer.</p> <p>Besides this, the Radarplot is used to train data storage as well as data recovery of a digital</p>

	<p>device.</p> <p>Later, the application of the knowledge is repeated during the nautical instructions in the SANDRA inland navigation simulator. The use of AIS/RIS can be applied in real sailing situations in order to give the trainees a high degree of security in the handling of using AIS/RIS.</p>
<p>C.2.2. Assessment</p>	<ul style="list-style-type: none"> The evaluation of the learning outcome and the acquisition of competences takes place at different levels: In addition to oral examinations at the beginning of individual lessons, written tests will be done in preparation for the final examination. These written tests consist of multiple choice as well as open questions. In addition, action-oriented workflows are to be processed practically based on situation-specific operations (Example: <i>Enter the AIS data for the following trip ... / What is the name of the vessel in front of you and how long is it? / What is the actual speed of the vessel to be overtaken?</i>). Therefore, we use checklists.



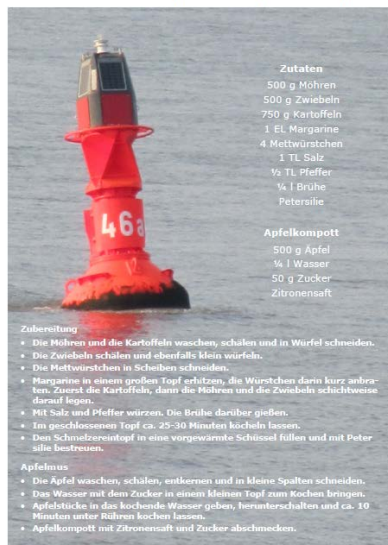
Brief instruction manual AIS/RIS (in German)

6.2. The boatman performs social behaviour

Plan, purchase and prepare simple meals

C.1. Best practice example	
C.1.1. Learning	<ul style="list-style-type: none"> Classroom lessons on background knowledge regarding the rules to be follow when preparing food and principles of healthy nutrition; Practical preparation of simple meals also in cooperation with partners in the dual system of apprenticeship
C.1.2. Assessment	<ul style="list-style-type: none"> Written tests, e-learning based tests; Practical examination in real-life oriented situations focussing on the trainee's ability to apply the theoretical rules to practical situations.

Schmelzereintopf mit Apfelkompott



Cooking recipe (in German)



School kitchen

C.2. Detailed Best practice Description	
C.2.1. Learning	<ul style="list-style-type: none"> The theoretical knowledge of food preparation is taught at school and substantiated by several practical lessons in which the trainees prepare their meals themselves. Therefore, a professional kitchen is available for usage by the school. The major part of the practical education takes place on board the vessels the trainees work on. Therefore, a close partnership between the school and the different shipping companies guarantees a vivid education in this field. At school the trainees gain the background knowledge about planning, shopping, cooking and cleaning, which they then have to use in their daily life on board.
C.2.2. Assessment	<ul style="list-style-type: none"> The evaluation has to focus on the ability of the trainees to apply the rules they learned during theoretical lessons to practical tasks and projects. Therefore, written evaluations are necessary to make sure that the trainees know the theoretical aspects. This is combined with practical examinations in which the students prepare meals according to the rules they know and thereby show their acquired ability.

A. COMPETENCE: ML 6. COMMUNICATION**B. Key competences:**

6.1 The boatmaster performs human resource management and social responsibility, takes care of organisation and training on board, assures at all time good communication.

C.1. Best practice example	
C.1.1. Learning	<ul style="list-style-type: none">• Classroom lessons supported by a book, PowerPoint and assignments. The teacher starts with a leadership test and confronts the class with how they like to be addressed. Also, the students have to practice a conversation on the three types of leadership.• Leadership is also a part of the practice record book. So, the student trains this competence on board
C.1.2. Assessment	<ul style="list-style-type: none">• Practical exam on board learning vessel. Skipper on board the vessel checks the competence. The student has to proof he can apply the knowledge and ability to execute the task with the right attitude. The Skipper on board the learning vessel checks the competences of the student according to a checklist.

C.2. Detailed Best practice Description	
C.2.1. Learning	<ul style="list-style-type: none">• Different PowerPoints• Book about leadership• different assignments about the theory regarding leadership• Test about leadership styles <p>On board</p> <ul style="list-style-type: none">• Practice record book (book with assignments during internship)
C.2.2. Assessment	<ul style="list-style-type: none">• Practical exam. Checklist for the skipper with different competences to check.<ul style="list-style-type: none">➤ gives instructions to the crew➤ Apply tasks and workload management➤ Gives feedback to the crew➤ Monitors the progress to be able to take measures

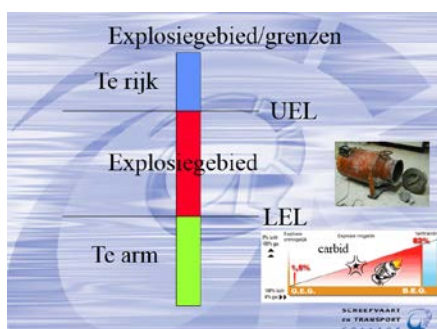
A. COMPETENCE: OL 7 - SAFETY, HEALTH AND ENVIRONMENTAL PROTECTION

B. Key competences:

7.1 The boatman works according to safe working rules and understands the importance of the care for safety, health and environment.

C.1. Best practice example	
C.1.1. Learning	<ul style="list-style-type: none"> Knowledge elements will be explained during classroom lessons; Students apply their knowledge and skills by working on board the training vessel according to the existing safety rules.
C.1.2. Assessment	<ul style="list-style-type: none"> The assessments are done onboard training vessel by means of a practical Proof of Competence Assessment of safe working rules is an integral part of the assessment on board during internships

C.2. Detailed Best practice Description	
C.2.1. Learning	<ul style="list-style-type: none"> Powerpoint presentations, video's and real equipment are used to support the transfer of knowledge to the students.
C.2.2. Assessment	<ul style="list-style-type: none"> Assessment of skills onboard training vessel by means of a practical test called "Proof of Competence". Based on the competences regarding the safe working rules and safety, health and environment, assessment forms are developed and used to assess the students.



E-learning screenshots (in Dutch)

7.2 The boatman acknowledges the importance of training and acts immediately in case of emergencies.

C.1. Best practice example	
C.1.1. Learning	<ul style="list-style-type: none"> Knowledge elements will be explained during classroom lessons; Students apply their knowledge and skills in a safety training centre.
C.1.2. Assessment	<ul style="list-style-type: none"> Knowledge test by means of written exams; "Proof of Competence" in the safety training centre; Assessment as an integral part of the internship on board.

C.2. Detailed Best practice Description	
C.2.1. Learning	<ul style="list-style-type: none"> During theory lessons by means of Powerpoint presentations, video's and real equipment are used to support the transfer of knowledge to the students. Besides the safety training centre is used to learn more about the procedures in practice

C.2.2. Assessment	<ul style="list-style-type: none"> • Knowledge test by means of written exams; • “Proof of Competence” in the safety training centre; • Assessment as an integral part of the internship on board.
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Training station: Rescue an unconscious person from a load tank

7.3 The boatman takes precautions to prevent fire and is able to use the firefighting equipment.

C.1. Best practice example	
C.1.1. Learning	<ul style="list-style-type: none"> • Knowledge elements will be explained during classroom lessons; • Students apply their knowledge and skills in a safety training centre.
C.1.2. Assessment	<ul style="list-style-type: none"> • Knowledge test by means of written exams; • “Proof of Competence” in the safety training centre;

C.2. Detailed Best practice Description	
C.2.1. Learning	<ul style="list-style-type: none"> • During theory lessons by means of Powerpoint presentations, video's and real equipment are used to support the transfer of knowledge to the students; • Besides the safety training centre is used, where students can learn more about the specific firefighting equipment and how and when to use it.
C.2.2. Assessment	<ul style="list-style-type: none"> • Proof of Competence to assess the related competences from the competence table. This assessment takes place in the safety training centre.



Training station: Firefighting

7.4 The boatman performs duties taken into account the protection of the environment

C.1. Best practice example	
C.1.1. Learning	<ul style="list-style-type: none"> Powerpoint presentations and videos to transfer the knowledge regarding the specific rules and regulations; During the work on board the training vessels the students apply their knowledge about the rules in practice.
C.1.2. Assessment	<ul style="list-style-type: none"> Assessment of knowledge takes place by means of a written test; Applying the rules is also an integrated part of the proof of competence on board the training vessel and during the internship.

C.2. Detailed Best practice Description	
C.2.1. Learning	<ul style="list-style-type: none"> Learning on board one of the training vessels. During the training the combination of knowledge, skills and attitude can be carried out and assessed.
C.2.2. Assessment	<ul style="list-style-type: none"> Proof of Competence to assess the related competences from the competence table. This assessment is part of the assessment on board the training vessel and during the internship.



Training vessel

A. COMPETENCE: ML 7 - SAFETY, HEALTH AND ENVIRONMENTAL PROTECTION

B. Key competences:

7.1 The boatmaster monitors and controls the applicable legal requirements and takes measures to ensure safety of life.

C.1. Best practice example	
C.1.1. Learning	<ul style="list-style-type: none"> Knowledge elements will be explained during classroom lessons; Students apply their knowledge and skills by working on board the training vessel
C.1.2. Assessment	<ul style="list-style-type: none"> Assessment of the monitoring and control skills onboard training vessel by means of a practical test called "Proof of Competence"; Assessment of these competences is an integral part of the assessment on board during internships

C.2. Detailed Best practice Description	
C.2.1. Learning	<ul style="list-style-type: none"> Powerpoint presentations, video's and real equipment are used to support the transfer of knowledge to the students

C.2.2. Assessment	<ul style="list-style-type: none"> A 'Proof of Competence on board' the training vessel will be used to assess the specific skills. Based on the competences regarding the control and monitoring on management level, specific assessment forms are developed and used to assess the students.
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First aid exercise



Training station

7.2 The boatmaster maintains safety and security for persons on board.

C.1. Best practice example	
C.1.1. Learning	<ul style="list-style-type: none"> Knowledge elements will be explained during classroom lessons; Students apply their knowledge and skills on board training vessel and during the internship
C.1.2. Assessment	<ul style="list-style-type: none"> Knowledge test by means of written exams; Assessment as an integral part of the internship on board

C.2. Detailed Best practice Description	
C.2.1. Learning	<ul style="list-style-type: none"> During theory lessons by means of Powerpoint presentations, video's and real equipment are used to support the transfer of knowledge to the students. Besides the training vessels are used to learn more about the procedures in practice
C.2.2. Assessment	<ul style="list-style-type: none"> Assessments by means of proof of competence.

7.3 The boatmaster sets up emergency and damage control plan and handles emergency situations.

C.1. Best practice example	
C.1.1. Learning	<ul style="list-style-type: none"> Knowledge about emergencies and damage control plans will be explained during classroom lessons; Students apply their knowledge and skills during practical exercises and on-board training vessels
C.1.2. Assessment	<ul style="list-style-type: none"> Knowledge test by means of written exams; "Proof of Competence" on board training vessels

C.2. Detailed Best practice Description	
C.2.1. Learning	<ul style="list-style-type: none"> During theory lessons by means of Powerpoint presentations, video's and real equipment are used to support the transfer of knowledge to the students; Besides training vessels and workshops are used, where students can learn more about how to deal with emergency situations.

C.2.2. Assessment	<ul style="list-style-type: none"> • Proof of Competence to assess the related competences from the competence table. This assessment can take place in the safety training centre or onboard training vessels; • This is also part of the integrated assessment method during the internship.
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7.4 The boatmaster ensures compliance with requirements for environmental protection

C.1. Best practice example	
C.1.1. Learning	<ul style="list-style-type: none"> • Powerpoint presentations and videos to transfer the knowledge regarding the specific rules and regulations; • During the work on board the training vessels the students apply their knowledge about the rules in practice.
C.1.2. Assessment	<ul style="list-style-type: none"> • Assessment of knowledge takes place by means of a written test; • Applying the rules is also an integrated part of the proof of competence on board the training vessel and during the internship.

C.2. Detailed Best practice Description	
C.2.1. Learning	<ul style="list-style-type: none"> • Learning on board one of the training vessels. During the training the combination of knowledge, skills and attitude can be carried out and assessed.
C.2.2. Assessment	<ul style="list-style-type: none"> • Theoretical test; • Proof of Competence

5. Conclusions

Summing up all relevant information received from IWTCOMP project partners, we may confirm that the following best practices proved to work in all key competencies for boatmen and boatmasters in IWT.

Use of ICT	OL 2, 4, 5, 6, 7 ML 1, 2, 4, 5, 6, 7
Training, traineeships, internship on board of a real or training vessel	OL 1,2, 3, 5, 6, 7 ML 1, 2, 3, 5, 7
Use of portfolio or training book in which competences and tasks which needed to be done are covered. During the education and practice this needs to be completed.	OL 1, 2, 3, 4, 5, 6, 7 ML 1, 2, 3, 4, 5, 6, 7
Workshops, practical training in school laboratories, visits.	OL 4, 6, 7
Simulator training	OL 1, 2, 6 ML 1, 2, 6

Schiffer-Berufskolleg RHEIN-	STC-Group	Maritieme Academie, Harlingen	University of Zilina	University of Craiova	CERONAV
E-Learning program "Smart Qu@lification"	ICT based program "Matroos op Koers"	ICT based program "Matroos op Koers"			
in-service experience on a vessel -practical demonstration and shipboard training	-training vessels -internship (stage) on board	Sailing period on training vessels	Practice in maritime companies, in port and docks	-Short distance navigation on "Apolodor" training vessel -Practice on board cargo and passenger inland ships	Training on inland waterway vessels
Training Record Book (on board), portolio and several training books (at the college)		portfolio		practice training book	Training Record Book
-Using laboratory equipment -training at training stations (e.g.	practice room training		Laboratory training	-Weekly practical activities in laboratory/ workshop -Visits in shipyards - Use of IWT	Training campus (vessel models, cranes, engines, workshop, rescue boat)

in the engine room or on a 1:1 scaled tank vessel model)				standard vocabulary (in German and English)	
Approved simulator training (Full Mission Bridge simulator)	Training on Inland Shipping Simulator. (Radar and Full Mission Bridge simulator)	IWT full mission simulator & simulator training tools			Training on inland simulators (Radar, ECDIS, loading and discharging of liquid dangerous goods)

Furthermore, the work developed by IWTCOMP project partners revealed that it is important to take into account the following considerations while implementing the didactical methods in a competence based learning process:

- **Use of modern training vessels, laboratories with modern training equipment and simulators equipped with latest technologies** to allow candidates to get the necessary skills which would facilitate subsequent mobility in all inland waterways. The training vessels should be equipped with all facilities, equipment and accessories, repair and maintenance tools, internal communication systems, lifesaving and labour protection equipment, allowing trainees to acquire applicable competences in appropriate real-life conditions under highest safety conditions. Individual training stations outside a training vessel must be able to depict realistically existing on-board functions and facilities.
- **Exchange of know-how and adoption of best practices from other IWT education and training institutions** is an essential part for the development of an innovative IWT education and training system.
- **Curricula/ Courses be based on international harmonized STCIN standards**
- **Training programmes be elaborated** and should strongly **differ for different target groups** like apprentices (having already practical training), students (with little experience on board), career changers or nautical personnel (further education).
- **Gaining international experiences is very important.** *The training vessel of a school* could run the whole length of the inland waters or only in certain countries, interested to participate. The advantage of a **common used vessel** is that it could be **run with international groups of trainers and trainees**. This way the trainees learn to work in international teams and get to know foreign stretches of waterways, e.g. of the Danube. According to HINT project, Considering the presumptions of the education and training concept, 480 students/trainees per year can be trained on board of the vessel, although the results of the requirement analysis show that it would be relevant for at least 580 persons.

Assessment of competence in IWT obtained from one or more of the following:

- approved in-service experience;
- approved training vessel experience;
- approved inland waterway simulator training, where appropriate, having a uniform standard for the technical features and functionalities determined by CESNI, along with standards for approving such tools
- approved laboratory equipment training;
- knowledge tests about technical details, operating principles, limitations, inland waterways, stretches with specific risks, sources of error;
- a limited number of journeys to be carried out on the stretch concerned, a simulator examination, a multiple-choice examination or a combination thereof;
- practical examinations executed on board a vessel /on a simulator, where appropriate